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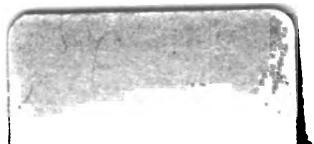

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CONTENTS.

PAGE

Officers of the Society iii

Price of the Transactions iv

Explanation of the Plates ix

Errata 170

Additions to the Library from the 1st of January, 1854, to the 31st December, 1855 xiii

Additions to the Collections from the 1st January, 1854, to the 31st December, 1855 xvi

List of Members, April, 1856 xvii

Journal of Proceedings from February, 1854, to January, 1856 . . . i

Index clix

MEMOIRS.

I. Notice of a Sackbearing *Bombyx*, found by Mr. Bates near Santarem, on the Amazons. By Edward Newman, Esq., F.L.S., &c. 1

II. Description of a new Species of *Lithocolletis*. By John Scott, Esq. 9

III. Critical Remarks upon the British *Elateridæ*, with Descriptions of some of the Species. By John Curtis, Esq., F.L.S., &c. 10

IV. Some Observations on the Excrement of Insects; in a Letter addressed to William Spence, Esq., F.R.S., &c. By John Davy, Esq., M.D., F.R.S., Inspector-General of Army Hospitals 18

V. Descriptions of some Coleopterous Larvæ, &c. By John Curtis, Esq., F.L.S., &c. 33

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PAGE

VI. Observations on the Economy of *Pompilus punctum*, and other *Hymenoptera*. By F. Smith, Esq. 41

VII. Description of a New British Species of *Ichneumon*. By Thomas Desvignes, Esq. 44

VIII. Characters of undescribed *Lucanidæ*, collected in China, by R. Fortune, Esq. By W. Wilson Saunders, Esq., F.R.S., &c. 45

IX. Descriptions of two Species of the Genus *Hemerobius* of Linnæus, new to this country, with Remarks on the Nomenclature of *Coniopteryx*, and on *Orthotænia Buoliana*, &c. By John Curtis, Esq., F.L.S, &c. 56

X. Supplemental Descriptions of Species of African, Asiatic, and Australian *Cetoniidæ*. By J. O. Westwood, Esq., F.L.S., &c. 61

XI. Notes on the Species of *Amycterus*, and allied Genera, with Descriptions of some new Species. By G. R. Waterhouse, Esq., F.Z.S. 75

XII. Descriptions of four new Species of Beetles, belonging to the Family *Paussidæ*. By J. O. Westwood, Esq., F.L.S., &c. 81

XIII. On some of the Difficulties of Entomological Students, as exemplified by recent Experience in the Genus *Elachista*. By H. T. Stainton, Esq. 84

XIV. Description of a New Genus of Coleopterous Insects inhabiting the interior of Ant's Nests in Brazil. By J. O. Westwood, Esq., F.L.S., &c. 90

XV. Essay on the Genera and Species of British *Formicidæ*. By Frederick Smith, Esq. 95

XVI. On the British Species of the Genus *Stenus*. With Notes on the Species of *Stenus* described by Kirby, and in the "Illustrations of British Entomology" by Mr. Stephens; together with Observations upon the Specimens in Mr. Stephens's Collection. By Messrs. G. R. Waterhouse and E. W. Janson. 136

XVII. Descriptions of some Species of Brazilian Ants belonging to the Genera *Pseudomyrma*, *Eciton*, and *Myrmica* (with Observations on their Economy, by Mr. H. W. Bates). By Frederick Smith, Esq. 156

XVIII. Monograph of the Australian Species of *Chrysomela*, *Phyllocharis*, and allied Genera. By J. S. Baly, Esq. 170

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PAGE

XIX. Observations on the Honey Bee, in Continuation of the Prize Essay of the Entomological Society, for the Year 1852. By J. G. Desborough, Esq. 187

XX. Descriptions of some New Species of Exotic *Lucanidæ*. By J. O. Westwood, Esq., F.L.S., &c. 197

XXI. Observations on the Species of *Elateridæ*, described by Mr. Curtis in the First Part of the Third Volume of the New Series of the Transactions of the Entomological Society of London. By E. W. Janson, Esq. 222

XXII. Memorandum on the Wing-Rays of Insects. By Edward Newman, Lsq., F.L.S., &c. 225

XXIII. On the Fresh-Water *Entomostraca* of South America. By John Lubbock, Esq., F.Z.S. 232

XXIV. Monograph of the Australian Species of *Chrysomela*, *Phyllocharis*, and allied Genera (continued from page 186). By J. S. Baly, Esq. 241

XXV. Characters of two undescribed Species of *Thrips*, Lin. By Edward Newman, Esq., F.L.S., &c. 264

XXVI. Descriptions of various Species of the Coleopterous Family *Pselaphidæ*, natives of New South Wales and South America. By J. O. Westwood, Esq., F.L.S., &c. . . . 268

XXVII. Characters of a few Australian *Lepidoptera*, collected by Mr. Thomas R. Oxley. By Edward Newman, Esq., F.L.S., &c. 281

XXVIII. Descriptions of Three Species of Indian *Micro-Lepidoptera*. By H. T. Stainton, Esq. 301

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EXPLANATION OF THE PLATES.

Plate.	Fig.		Page
I.	1.	*Lithocolletis irradiella*, Scott	9
	2.	*Perophora Batesii* ♂, and details	5, 8
	3.	,, ,, ♀, and antenna	5
	4, 5 & 6.	,, ,, larva	5
	7.	,, ,, venation of wing	5
II.	1.	*Ectinus aterrimus*, Linn., Curt., and details	12
	2.	,, ? *gagates*, Curt., and details	12
	3.	n. g. *puncto-lineatus*, Pelerin, and details	13
	4.	*Elater nigrinus*, Payk., and details	14
	5.	*Aplotarsus maritimus*, Curt., and details	15
	6.	*Cardiophorus formosus*, Curt.	15
	7.	*Aplotarsus ? cothurnatus*, Curt.	16
III.	1 & 2.	*Lucanus Fortunei*, Parry, ♂ and ♀	46
	3.	*Cladognathus gracilis*, Saund.	47
	4 & 5.	*Odontolabris emarginatus*, Reiche, ♂ and ♀	49
	6.	*Ægus punctiger*, Saund.	55
	7.	*Platyprosapus platymelus*, Saund.	50
	8.	,, *Hopei*, Saund.	50
IV.	1.	*Odontolabris nitidus*, Saund.	47
	2 & 3.	,, *sinicus*, Reiche	48
	4.	*Dorcus ? striatus*, Saund.	53
	5.	*Dorcus striato-punctatus*	51
	6.	*Dorcus ? marginalis*, Saund.	53
	7.	*Dorcus obscurus*, Saund.	52
	8.	*Ægus lævicolle*, Saund.	54
	9.	*Dorcus vicinus*, Saund.	51
V.	1 to 8.	*Velleius dilatatus*, larva and details	33
	9 to 12.	*Athous rhombeus*, larva and details	35
	13 to 22.	*Bolitophagus reticulatus*, larva and details	36
	23 to 32.	*Prostomis mandibularis*, larva and details	37
	33 to 40.	,, ,, imago and details	38
VI.	1.	*Goliathus micans*, Drury, details	61
	2.	*Ceratorhina Passerinii* ♀, and details	62
	3.	*Goliathus Smithii* ♀, and details	62
	4.	*Asthenorhina Turneri*, Westw. ♀, and details	63
	5.	*Tmesorrhina Saundersii*, Westw., and details	64
	6.	*Gnathocera Angolensis*, Westw., and details	65

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Plate.	Fig.		Page
VII.	1.	*Heterrhorhina bicostata* ♂, Schaum, and details	66
	2.	*Narycius Hamiltoni* ♀, Westw.	67
	3.	*Dicronocephalus Wallichii*, Hope, and details	69
	4.	*Cosmiomorpha setulosa*, Westw.	70
	5.	*Macronata fraterna*, Westw.	71
	6.	,, *regia*, Fab.	72
	7.	,, *setipes*, Westw.	73
	8.	*Eupœcila ochracea*, Westw., and details	73
	9.	,, *succinea*, Hope, and details	74
VIII.	1—21.	*Gnostus formicicola*, Westw., and details	90—94
IX.	1—28.	For explanation, see	135
X.	1.	*Colophon Westwoodii*, Gray, and details	197, 198
	2.	,, *Thunbergii*, Westw., and details	198, 199
	3.	*Lucanus Thibeticus*, Westw., and details	199, 200
	4.	,, *biplagiatus*, Westw., and details	200, 201
	5.	*Odontolabris Evansii*, Westw., and details	201, 202
	6.	*Cladognathus piceipennis*, Westw., and details	202, 203
XI.	1.	*Streptocerus speciosus*, Fairm., ♀, details	204
	2.	*Sclerostomus hastatus*, Westw., and details	205, 206
	3.	,, *Neotragus*, Westw., and details	207
	4.	,, *Ditomoides*, Westw., and details	208
	5.	,, *costatus*, Burm., and details	209
	6, 7.	*Cacostomus squamosus*, Newm., and details	211, 212
	8.	*Scortizus maculatus*, Klug, details	210
XII.	1.	*Lissotes Menalcas*, Westw., and details	214
	2.	,, *subtuberculatus*, Westw., and details	215, 216
	3.	,, ? *crenatus*, Lat. MSS., and details	216, 217
	4.	*Dorcus*? *luteus*, Westw., and details	218, 219
	5.	*Figulus Lilliputanus*, Westw., and details	219, 220
	6, 7.	*Sclerostomus caviceps*, Westw., and details	212, 213
	9.	,, *femoralis*, Guérin, details	209, 210
XIII.	1—19.	For explanation, see	169
XIV.	1.	*Phyllocharis cyanipennis*, Baly, and details	174
	2.	*Lamprolina æneipennis*, Boisd., and details	177
	3.	*Eulina Curtisii*, Baly, and details	180
	4.	*Chalcolampra thoracica*, Baly, and details	183
	5.	*Australica submetallica*, var.	252
	5a—5c.	,, *Curtisii*, Kirby, details	243
	6.	*Chalcolampra pustulata*, Baly	181
	7.	*Chalcomela eximia*, Baly	260
	8.	,, *sulcata*, Baly, and details	258
	9.	*Cyclomela nitida*, Baly, and details	257
XV.	1—9.	For explanation, see	240
XVI.	1.	*Bryaxis strigicollis*, Westw.	269
	2.	,, *quadriceps*, Westw.	270
	3.	,, *atriventris*, Westw.	270
	4.	*Tyrus spinosus*, Westw.	271

Digitized by Google

PLATE.	FIG.		PAGE
	5.	*Tyrus humeralis*, Westw.	272
	6, 7.	*Batrisus angulatus*, Westw.	273
	8.	*Pselaphus Antipodum*, Westw.	274
	9.	,, *geminatus*, Westw.	273
XVII.	1.	*Artiocerus angusticollis*, Westw.	275
	2.	,, *curvicornis*, Westw.	275
	3.	,, *setipes*, Westw.	276
	4.	,, *dilaticornis*, Westw.	276
	5.	,, *Brasiliensis*, Westw.	277
	6.	*Metopias Curculionoides*, Westw.	278
	7.	,, *bellicosus*, Westw.	278
	8.	,, *pacificus*, Westw.	279
XVIII.	1.	*Œcophora Paulinella*, Newm.	297
	2.	,, *Isabella*, Newm.	295
	3.	,, *Ellenella*, Newm.	295
	4.	,, *Arabella*, Newm.	296
	5.	*Anesychia Stella*, Newm.	290
	6.	*Chimabacche Cinderella*, Newm.	288
	7.	*Œcophora Marionella*, Newm.	294
	8.	*Tortricopsis Rosabella*, Newm.	293
	9.	*Teara Guenéi*, Newm.	284
	10.	,, *Edwardsii*, Newm.	284
	11.	*Termessa Shepherdi*, Newm.	285

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FROM THE 1st JANUARY, 1854, TO THE 31st DECEMBER, 1855.

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Mr. G. A. Drew ....*Sirex gigas.*

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„ „ „ A box from Northern India
Mr. S. P. Pratt ....Various, from the Himalayan district.
Mr. Thwaites .....Various, from Ceylon.
Herr Pretsch .....Specimens of the silken fabric worm by the larvæ of *Saturnia Pavonia-media.*
Mr. W. Spence.....Various, from Ceylon.

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List of Members

OF

THE ENTOMOLOGICAL SOCIETY

OF LONDON,

APRIL, 1856.

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TRANSACTIONS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON.

I. *Notice of a Sackbearing* Bombyx, *found by Mr. Bates near Santarem, in the Amazons.* *By* Edward Newman, Imp. L. C. Acad. Memb., F.L.S., &c.

[Read April 3rd, 1854.]

As a preliminary observation I take the liberty of remarking that in arranging the following notes I have in no instance mingled definitions that may possibly belong to different objects. Each description of larva, pupa or imago is made directly from an individual, and has no reference whatever to any other description published or unpublished.

The genus *Saccophora* was proposed by Dr. Harris, the well-known American Entomologist, in a letter addressed to our late inestimable Secretary, Mr. Edward Doubleday, and published by that excellent Lepidopterist in "The Entomologist" for May, 1841; it was founded on a single species, which Dr. Harris then called *Saccophora Melsheimeri*, in honour of Dr. Melsheimer, who was the first to find its cocoon and record observations on its habits. "I propose," says Dr. Harris, "to call the genus *Saccophora*, and the species *Melsheimeri*."

Subsequently Dr. Harris, in his admirable Treatise on Insects Injurious to Vegetation, published in 1842, gives the same insect a second generic name, namely, *Perophora*. "I call it," writes Dr. Harris, "*Perophora Melsheimerii*, Melsheimer's sackbearer." No allusion whatever is made to the earlier name. The name of *Perophora* will certainly be adopted in the United States, as

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that given by the author who instituted the genus, and it seems courteous to follow him, under the supposition that he had a sufficient reason for renouncing the prior name.

The second species was found in May, 1853, by my friend Mr. Bates, in the Valley of the Amazons, and I propose to name it after that indefatigable collector, as an humble tribute to his untiring zeal.

Genus Perophora, Harris.

Imago.—Maxillæ obsoletæ; palpi maxillares nulli; palpi labiales breves, porrecti, squamosi; antennæ basi approximatæ, breviores, subgeniculatæ, i. e. articulo basali incrassato, porrecto, cæteris divaricatis, 44-articulatæ, bipectinatæ, a 1mo ad 11um ramulis longitudine sensim crescentibus, inde ad 25um sensim descrescentibus, cæteris paribus, brevissimis, omnibus ciliatis: *sexuum amborum* alæ amplæ, anticæ subfalcatæ, posticæ abdomine breviores: *maris* abdomen manifesto bifurcatum.

Larva involucro mobili foliis constructo vitam deget: involucrum trahit: folia devorat.

Pupa involucro, apice affixo, mutat.

Sp. 1. *Perophora Melsheimerii.*

Tota pallide rubro-cinerea vel isabellina: alis punctis minutis nigris undique irroratis, fasciâ lineari fuscâ communi obliquâ ante anticarum apicem retrorsum angulatâ, punctoque majori nigrescenti mediano signatis.

Saccophora Melsheimeri, Harris, "Entomologist," p. 101.

Perophora Melsheimerii, Harris, "Insects Injurious to Vegetation," 1st ed. p. 299; Id. 2nd ed. p. 319.

Hab. Sylvis apud Cambridge (Mass.), Americæ Septentrionalis, larva involucro vitam degens, Quercuum folia devorans.

Larva of Perophora Melsheimerii, of Harris.

A case of this insect, containing a living caterpillar, was brought to Dr. Harris, towards the end of September, by a student of Harvard College, Mr. H. O. White, who found it on an oak tree in Cambridge. This case was nearly an inch and a half long, and about half an inch in diameter. It was not regularly oval, but

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somewhat flattened on its lower side. It consisted externally of two oblong oval pieces of a leaf, fastened together in the neatest manner by their edges, but the seams made a little ridge on each side of the case; this had become dry and faded, and was lined within with a thick and tough layer of brownish silk, in which there was left at each end a circular opening, just big enough for the larva to pass through. The larva was cylindrical, of a light reddish brown colour, with a paler line along the back; it was rough, with little elevated points; its head and the top of the first ring were black, hard and rough also. The head was provided with a pair of jointed feelers, which the insect extended and drew in at pleasure, and which, when they were out, were kept in continual motion. On each side of the middle of the head there was a black and flexible organ, like an antenna, very slender where it joined the head, and broader towards the end, like the handle of a spoon. The first three pairs of legs were equal in length, and armed with stout horny claws. The other legs, if such they could be called, were ten in number, and so short that only the oval soles of the feet were visible, and these were surrounded by numerous minute hooks. The anal extremity of the body was as blunt as if it had been cut off with a knife; it sloped a little backwards, and consisted of a circular horny plate, of a dark gray colour, which, when the larva retired within its case, exactly fitted and closed one of the holes. This larva ate the leaves of the oak, and fed mostly by night; while eating it protruded half its body out of its case, and in moving laid hold of the leaf with its fore legs, and then shortened its body suddenly, so as to bring its case after it with a jerk; and in this way it went by jerks from place to place. When it had done eating it moored its case to a leaf by a few silken threads fastened to one, and sometimes to both ends; and before moving again, it came out and bit off these threads, close to the case. It could turn round easily within its case, and go out of either end as occasion required. So tenaciously did it cling to the inside of its case with the little hooks of its false feet, that all attempts to make it come wholly out, except by a force which would have been fatal to the insect, were without effect.

Pupa of Perophora Melsheimerii.

This kind of caterpillar prepares for transformation by fastening both ends of its cocoon to a branch, and then stops up each of the holes in it with a little circular silken lid, exactly fitting

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the orifice, and made about the thickness of common brown paper. There is no great difference in the size or form of the chrysalids which produce the male and female moths; they are about three-quarters of an inch in length; on both of them the sheaths for the wings, antennæ and legs are alike, and are as plainly to be seen as on the chrysalids of other winged moths. The chrysalis tapers very little, and does not end with a point, but is blunt behind; and on the edge of each of the rings of the back there is a transverse row of little pointed teeth, which shut into corresponding notches in the ring immediately behind them. These teeth are evidently designed to enable the chrysalis to move towards the mouth of its case, and to hold with when it is engaged in forcing off the lid in order to allow of the escape of the moth.

Imago of Perophora Melsheimerii.

Both sexes leave their cocoons when arrived at maturity, and both are provided with wings. Their feelers are of moderate size, cylindrical, blunt, pointed, and thickly covered with scales. The tongue is not visible. Their antennæ are curved, and are recurved or bent upwards at the point; the stalk is feathered in a double row, on the underside, very widely in the males for more than half its length, and beyond the middle the feathery fringe is suddenly narrowed, and tapers thence to the tip; in the females the antennæ are also doubly feathered, but the fringe is narrower throughout than in the other sex. The body and the wings almost exactly resemble those of the foreign silk-worm moth in shape; but the fore wings are rather more pointed and hooked at the tip. There are no bristles and hooks to hold together the wings, which, when at rest, cover the sides like a sloping roof, and the front edge of the hind wings does not project beyond that of the fore wings.

The neuration of the wings is very different from the typical *Bombycidæ*, at least from that of the large *Saturniæ*. The costal nervure is faint, and terminates on the costal edge at two-thirds length of the wings. Sub-costal throws off its first and second nervures before the end of the cell; the second nervure being the strongest vein in the costal part of the wing. The upper disco-cellular nervure is very short and nearly transverse to the wing; the middle is of the same length as the lower; the middle imperfect in its middle part, the lower perfect. The maxillæ are apparently wanting, and the middle spurs of the hind tibiæ are imperceptible, showing that the character, together with the an-

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tennæ, are more constant for the larger groups of *Lepidoptera* than the wing neuration, which in the *Bombycidæ* varies much.

I cannot find that Dr. Harris mentions in what month the imago made its appearance in Massachusetts: Mr. Edward Doubleday took both sexes in Virginia in July.

Sp. 2. *Perophora Batesii.*

Tota testacea: oculis nigris, alis punctis nigris irroratis, fasciâ lineari, saturatiori, communi, obliquâ ante anticarum apicem retrorsum angulatâ, lunulâque apertâ centrali, signatis.

Corp. long. ♂ ·9 unc.; ♀ 1·1 unc. Alar. dilat. ♂ 1·4 unc.; ♀ 2·2 unc.

Hab. Sabuletis apud Santarem Americæ Meridionalis larva involucro vitam degens, Byrsominarum et Melastomarum folia devorans.

Larva of Perophora Batesii.—The larva is enclosed in a somewhat spindle-shaped case, which has a circular aperture at each end: it is constructed of portions of two leaves joined together along the sides with admirable nicety; a slight seam is visible, but it is almost impossible to detect the mode in which the junction is effected. The head and dorsal surface of the prothorax are black and rough; the dorsal surface of the meso- and metathorax are yellow, with two longitudinal black vittæ; the abdomen is ovate and bulky, of a yellowish or olivaceous colour above, and sprinkled or marbled with dusky atoms, and a yellow vitta running along each side just below the stigmata. The under surface of the head, three thoracic and two next following abdominal segments is black, that of the remaining abdominal segments is a ruddy flesh colour. There are six thoracic legs as usual, and ten very short prolegs or claspers, viz. a pair on the 6th, 7th, 8th, 9th and anal segments. Mr. Bates found a considerable number of these larvæ in their cases, each attached by two or three strong threads to the leaves of low bushes of Byrsominæ and Melastomæ, and also to blades of grass in open sandy situations, near Santarem, in May last, towards the end of the rainy season.

Pupa of Perophora Batesii.—Mr. Bates records that the transformations of the pupa are completed within the case, but he gives no description of the pupa; neither does he seem to have transmitted one for examination.

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Imago of Perophora Batesii.

Male.—Antennæ short, bipectinate, the first joint (scape of Kirby) large and expanding outwards into a cup, the opening of which is placed obliquely with the head, and to its centre the second joint is attached, and this, as well as the remaining joints, is directed outwards, so that the antennæ may be said to be geniculated at the first joint: the remaining joints are forty-four in number; their branches gradually increase in length from the 1st to the 11th, and then as gradually decrease to the 25th; the rest are uniformly short, all the branches are delicately ciliated to their extremity. Eyes prominent, black, marbled with brown. Maxillæ apparently wanting. Palpi minute, closely appressed and entirely concealed by the somewhat projecting face. Thorax simple, without any crest; abdomen tapering, rather longer than the hind wings, terminating in two long, hirsute parallel porrected processes. Legs short, protibiæ densely clothed with long setiform scales; joints of tarsi cup-shaped; claws stout, short, strongly uncinate; spurs not observable, probably wanting.

Female.—Antennæ as in the male, but the cilia of the branches less distinct, and the branches themselves somewhat shorter; palpi somewhat more produced, their apex observable from above. Eyes slightly smaller than in the male, black and beautifully reticulated; each area of the reticulation includes from fifty to one hundred facets; possibly the mode of killing may have caused the appearance of the eyes in both sexes. Legs as in the male, but the protibiæ not so densely clothed. Abdomen robust, longer than the hind wings; its apex undivided, but there is a short tuft on each side.

Male and *female* much alike, both amply winged, but the wings of the female more ample than those of the male; fore wings subfalcate, the apical wings acute, their anal angle obtuse, their outer margin sinuate; hinder wings rather short, their outer angle rounded, their anal acute and slightly produced, their outer margin sinuate. The entire colour of body and wings testaceous and sprinkled over with minute black dots, each of which is composed of a single scale, differently shaped from the rest. There is a transverse linear angulated fascia common to both wings, and of a darker colour; this commences on the costa of the upper wings, at about two-thirds of its length, and runs diagonally towards the outer margin, but before it has reached half the distance between its origin and the margin, it turns backwards at a right angle, and then traverses both wings in a direct line, ceasing on the ab-

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dominal margin of the lower, about half way between its base and anal angle; within the angle of this fascia, and near the centre of the upper wing, is an open, rather indistinct, lunule.

Although I feel that it would be an act of presumption on my part to attempt to locate this curious genus, after such eminent Lepidopterists as Dr. Harris and Edward Doubleday have declined doing so, still I may venture to call the attention of the Society to a few characters which are as strongly pronounced as they are remarkable for their conflicting nature.

In the first place, it seems almost impossible, on a cursory examination of Mr. Wing's admirable sketches of the larva in its case, not to be struck with its great similarity to that of the *Psychides*. The larva of *Psyche Villosella*, of Ochsenheimer, Herrich-Schæffer and Bruand, found by Mr. Dale on Parley Heath, offers points of similarity that at the first blush seem almost conclusive: not only is the general character as regards figure, the short prolegs, the structure of the anal segment, &c. very similar in the two, but the distribution of colour, the roughness and blackness of the head and protborax, and the vittated meso-and metathorax, are very nearly identical.

The pupa, judging from Dr. Harris's very minute description, possesses a character distinctive of a very different section of the *Bombyces:* the abdominal segments are banded with a series of minute claw-like processes, which make it rough to the touch, and by means of which the insect can force its way out of the case, cocoon, gallery, or other situation, in which its unerring instinct may have placed it; such a character I find in *Xyleutes*, *Zeuzera*, *Hepialus*, *Ægeria*, and *Trochilium*.

The *Imago* has several characters, which are not only conflicting with those of the preparatory state, but which are also conflicting among them; thus the antennæ of the male greatly resemble those of the male *Zeuzera*, those of the female differing from those of the female *Zeuzera;* and the venation of the wings in both sexes differing entirely from that of *Zeuzera*. The divided and divaricating extremity of the abdomen in the male is a marked and notable character: this character gives its name to Edward Doubleday's genus *Schizura* (Entomologist, p. 59), and the description of the male antennæ in *Schizura* closely agrees with the male antennæ in *Perophora*, while the female antennæ totally differ in the two genera; those of *Perophora* being pectinated, those of *Schizura* setaceous. In *Lochmæus*, *Heterocampa*, and other American *Bombyces*, we find points of similarity and discrepancy equally conflicting. *Heterocampa*, in very many charac-

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ters, approaches *Cerura*, and its tapering abdomen, raised when at rest, suggests a close affinity to that genus; but Abbott, whose drawings of Georgian Lepidopterous larvæ are worthy of all praise, represents a larva of this genus grasping a twig of Styrax grandifolium with anal prolegs: the species to which this belongs is known, but has not received a name. As far as regards the male antennæ, the palpi and the maxillæ, *Perophora* closely approaches *Heterocampa*, but nothing can be more discordant than the two larvæ. Dr. Harris very properly contrasts the genus with *Dryocampa* and *Oiketicos*, but concludes that it has but slender affinities with either. The characters of *Lochmæus*, *Heterocampa* and *Schizura* had not been published when Dr. Harris studied the insect in 1840; and his work of 1852 does not mention them, perhaps considering the object of that work rather utilitarian than scientific.

Among British insects, the nearest approach we have to *Perophora* is the perfect female of *Odonestis potatoria;* the similarity extends to colour, distribution of marking, and venation of wings; but the antennæ and palpi are very different; the male of *potatoria* has, like that of *Perophora*, a bifid apex to the abdomen. These slight resemblances are, however, more than balanced by the total discrepancy between the larvæ of the two genera.

The result of these observations seems rather to be that Lepidopterists are right in grouping together the infinitely varied genera of *Bombyces;* since they show that the characters are intimately interwoven, crossing each other at a vast number of points, like the threads of which a net may be constructed; but I think that the difficulty of reconciling or harmonizing these peculiarities to such an extent, as to obtain anything approaching to a perfectly natural linear series of the objects themselves, is quite insuperable. I may also venture to express an opinion, derived from a very careful study of Bruand's admirable Monograph of the *Psychides*, that the connexion of *Perophora* with that interesting group is not so close as the *primâ facie* characters of the larvæ would lead one to suppose.

EXPLANATION OF PLATE I.

Fig. 2. *Perophora Batesii*, ♂.
2*a*, head and antenna of male; 2*b*, portion of antenna of male magnified; 2*c*, abdominal appendages of male.
Fig. 3. *Perophora Batesii*, ♀.
3*a*, antenna of female.
Figs. 4, 5, 6, *Perophora Batesii*, larva.
Fig. 7. Venation of wing.

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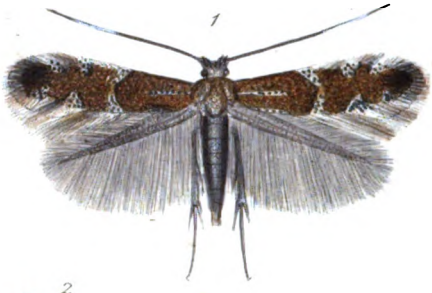

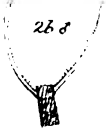

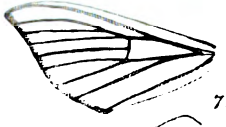

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II. *Description of a new Species of Lithocolletis.* By John Scott, Esq.

[Read 3rd October, 1853.]

Lithocolletis irradiella. (Pl. 1. fig. 1.)

At first sight this insect much resembles *L. lautella*, but is easily distinguished from it by its darker anterior wings, the streaks being more slender, and the spot at the anal angle not being on the inner margin.

Expansion of the wings 4 lines.

Tuft of the head black, face and palpi shining, silvery; antennæ darkish, with a broad white ring near the tip, which last is black; thorax blackish; abdomen blackish, beneath white; the four anterior legs have the femora and tibiæ white; the posterior legs have the femora black, tibiæ white; tarsi of all the legs white, except the basal joint of each, which is black above, throughout nearly its whole length.

Anterior wings olivaceous-brown, with three silvery white streaks along the costa, nearly equidistant from each other, and two on the inner margin. The first costal streak is placed considerably before the middle of the wing, it nearly reaches the fold (rather obliquely) and points towards the anal angle of the wing; the second costal streak is situated rather more than halfway between the first and third, somewhat crescent-shaped, broadest at its base, and also terminates a little short of the fold; the third costal streak is nearly uniform in thickness throughout, and is much more curved than the preceding. The first inner marginal streak lies a little in front of the first costal one, the exterior point of the base of the latter being nearly in a line with the interior point of the base of the former, its apex terminating a little beyond the fold of the wing, and beyond the apex of the first costal streak, which it almost touches; the second inner marginal streak lies opposite the end of the second costal streak, and forms with it an interrupted fascia, not touching the inner margin, and beyond the apex of the third costal streak, to which it points, is a minute, nearly round, silvery-white spot. The basal streak, also silvery-white, is narrow and short, and is rather nearer the costa than the inner margin, and there is a small oblong spot on the inner margin

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near the base. The tips of the anterior wings in some lights steel blue. Dark margins enclose all these white markings. The apical black spot is almost concealed in the deep ground colour of the wings. Posterior wings purplish, cilia the same.

Taken in the beginning of July, near Renfrew, amongst birches in a damp part of a wood.

III. *Critical Remarks upon the British* Elateridæ, *with Descriptions of some of the Species. By* John Curtis, F.L.S., &c.

[Read 6th February, 1854.]

What is the *Elater aterrimus* of Linnæus? This simple question has led to numerous discussions, and before the genus *Elater* was published in the "British Entomology," I spared no pains to arrive at the truth, which one would think was easy enough from our possessing the collections of Linnæus: such, however, is not the case, and, as I have frequently stated, unless the specimens in the Linnæan cabinet agree perfectly with the descriptions in the "Fauna Suecica" or the "Systema Naturæ," the authority is worthless. It is not to be supposed that the collection is as the elder Linnæus left it; for, owing to the natural casualties attending such fragile and perishable objects as insects, when neglected, and the various hands the property has gone through during the greater part of a century, it could not be expected to remain intact: moreover, at that early stage of natural science, it cannot be controverted that species quite distinct were included in cabinets under the same name, and Linnæus, no doubt, during his lifetime, left a great deal to be filled up by his pupils and friends. Indeed, as far as nomenclature goes, no collection that I have seen, of half the standing of Linnæus's, has been worth much to identify species; and this misfortune has been daily increasing from the egregious folly which has been so prevalent of multiplying species, and, under the most frivolous pretext, of superseding old and well-established names.

This is so important a subject, that I must be permitted to guard the rising generation of Entomologists against being misled by what is termed high authorities—indeed, not to put implicit

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faith in any collection, but to refer to standard books. For my own part, if a specimen in any collection, however celebrated, does not agree essentially with the author's printed description, I totally disregard it. I make no exceptions, being justified by my own experience of many years, as will be evident from the following facts.

The Banksian collection of insects, named by Fabricius, was in such a state of confusion when bequeathed to the Linnæan Society, that some twenty years since the late Mr. C. T. Bennett, Mr. Vigors and Mr. Haworth undertook, with the volumes of Fabricius before them, to correct the nomenclature, assigning to each specimen the name it was believed that Fabricius had given it—by no means an easy task, where many must have been lost and others added. Since then the specimens have got mouldy and have been cleaned, which with the greatest care cannot fail to lead to alterations, to say nothing of unavoidable accidents.

When I went to see Mr. Marsham's collection before his death, I found it in the possession of a naval officer, who kept it clean by reversing the drawers and rapping the bottoms, by which process heads, trunks and entire insects fell upon the floor, and numbers of labels were changed or lost, or, what was worse, quite different things were eventually substituted to replace them. During my visit I picked up and restored to the drawers no inconsiderable number of specimens.

And even Mr. Kirby's collection of British insects was entirely neglected long before he presented it to the Entomological Society, owing in a great measure to his attention being devoted to exotic Entomology: he was also much in want of more drawers, and, to make room for Captain Hancock's fine *Coleoptera* from Brazil, Mr. Kirby took out his entire collection of bees, so that when I visited him at Barham in 1817 it was stuck on sheets of cork and mounted on the top of a book-case, covered with dust and mutilated by the larvæ of moths and spiders; and had I not volunteered to clean the specimens and place them in security, that interesting collection would never have reached its present destination—it must have perished in a few months! As it was, many of the typical specimens were destroyed, and it was necessary to transfer the labels to duplicate specimens, whenever they could be found.

From this digression I will return to the *Elaters*. Having purchased Mr. Charles Griesbach's Cabinet of *Coleoptera*, I found it very rich in *Elaters*, and amongst them one quite new to me; and wishing to give a figure of it in my "British Entomology," I began to search for its name, and as it appeared to be the *Elater*

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aterrimus of Linnæus, I thought the point would be readily settled by a visit to Soho Square. On consulting the Linnean cabinet what was my surprise to find the only specimen to represent *Elater aterrimus* was a greasy individual of *E. murinus!* I thought, however, that my insect agreed so well with the description in the "Fauna Suecica,"* that I might adopt the Linnæan name, which I did in June, 1838.† Having since then received specimens from Denmark and Germany of the species considered abroad to be the true *E. aterrimus*, and having seen Mr. Stephen's collection, now deposited in the British Museum, I will give the result of my researches.

Sp. 1. *Ectinus aterrimus*, Linn., Pauz. 101, 15; Payk. 3, 6, 8; Gyl. i. p. 425; *atratus*, Ill. Mag.; *obscurus*, Oliv. 2, Genus 31, pl. 8, fig. 76. (Pl. II. fig. 1.)

Long and narrow, shining black and minutely punctured; antennæ as long as the thorax (fig. *a*); basal joint long and stoutish; second and third of equal length, obovate, the following compressed, a little longer and somewhat serrated. Head deflexed, obtuse; clypeus trigonate, truncate (fig. *b*). Thorax linear, elongated, with a channel down the centre, strongest at the base; the angles prominent, stout but acute; pectoral spine long, pointed, depressed, convex at the base. Elytra twice as long as the thorax and a little broader, punc :te-striate, faintest at the base; tarsi simple, reddish-fuscous.

6 lines long, 1½ broad.

The late Dr. Sturm, of Nurenburg, sent me this species labelled *E. aterrimus*, Linn., and I have another from Denmark: it is of course a native of Sweden, but I have never seen a British specimen. Mr. Stephens having copied Gyllenhal's essential Latin character verbatim, it answers to this insect, but it entirely disagrees with his English description, and likewise with the specimens named in his collection *Ectinus aterrimus*, which belong to a totally different section.

Sp. 2. *Ectinus? gagates*, Curt.; *Elater aterrimus*, Curt. Brit. Ent. fol. and pl. 694. (Pl. II. fig. 2.)

Long, narrow, depressed, dead-black; antennæ scarcely so long as the thorax (fig. *c*), serrated, excepting the basal joint, which is short and stout, and the second and third, which are small and obovate. Head short, semi-orbicular (fig. *d*); clypeus trigonate, and extending a little over the labrum, the trophi nearly con-

* Page 206, No. 726. † Fol. and Pl. 694.

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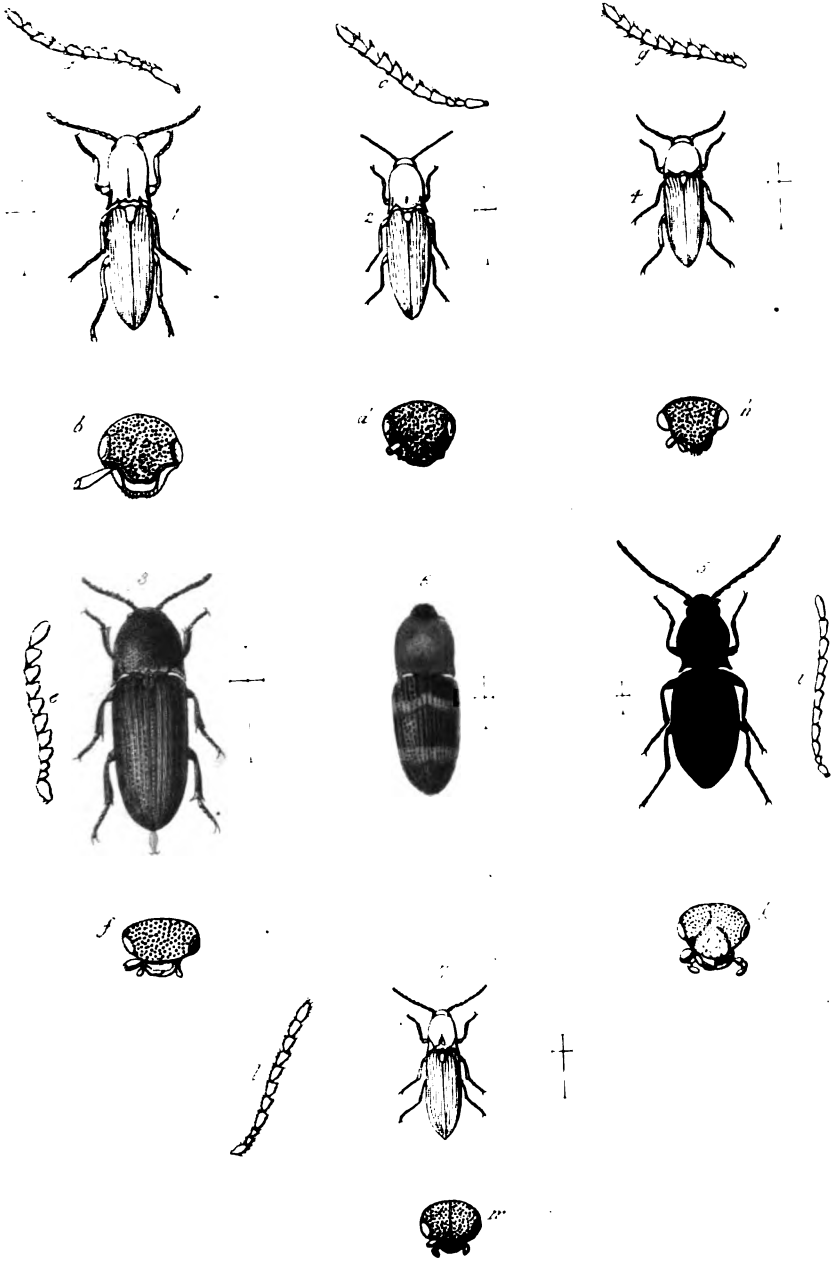

J. Curtis. del. 1854

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cealed. Thorax linear, extremely finely punctured, with a faintly impressed line posteriorly; the angles well produced and acute, forming a sharp ridge at the base; pectoral spine long, acute and grooved at the base. Elytra not broader than the thorax, but more than twice as long, slightly glossy, rather thickly punctured and striated; the striæ close together and rough at the apex, which is emarginate. Legs very slender, knees slightly ferruginous; tarsi simple; claws ochreous.

5 lines long, 1¼ broad.

This fine and very distinct insect does not agree with any of the genera with which I am acquainted, but for the present I have placed it with *Ectinus?* rather than run the risk of imposing a generic name unnecessarily. I have only seen the specimen in my Collection, which was taken at Windsor, and another foreign one in the British Museum. Mr. Stephens, relying on his memory, has unluckily applied Paykull's descriptions of *Elater nigrinus?* to this insect, with points of doubt which were most necessary, for they do not agree in any way, nor belong even to the same genus. Our insect is not shining; the antennæ are not so long as the thorax; the tarsi are not pale, and it is very much longer than *Elater bipustulatus*, which Paykull gives as the size of *E. nigrinus*.

Sp. 3. *N. G.? puncto-lineatus*, Zool. Journ. iv. 524; *aterrimus*, Stephens' Cabinet. (Pl. II. fig. 3.)

Robust, elliptical, very convex, slaty-black, glossy but dull, being clothed with very short ochreous pubescence. Antennæ scarcely so long as the thorax (fig. *e*); basal joint small but stout; second and third globose, the following compressed and subserrated, the joints being obtrigonate. Head and thorax thickly and firmly punctured; clypeus short, scarcely convex in front and not margined, projecting and not drooping over the mouth (fig. *f*). Thorax semiovate, considerably broadest at the base, with a smooth line down the centre, the angles forming triangular lobes, not acuminated but slightly clawed; pectoral spine rather short, compressed and not concave at the base, scutel depressed, semioval. Elytra a trifle broader than the thorax, and twice as long, minutely punctured and firmly striate-punctate. Legs stout, tarsi simple, compressed, brownish, tawny at the extremity.

6½ lines long, 2 lines broad.

This is the *Elater puncto-lineatus*, as referred to above, in the Zoological Journal. Mr. Stephens, in his Illustrations, refers

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also for this species to the "Zool. Journal, vol. iv. p. 211, under the name of *Elater pilistriatus*," but this is altogether an unaccountable mistake, for nothing of the kind is to be found. All Mr. Stephens' other synonyms being copied from Gyllenhal, they do not belong to this species but to the Swedish naturalists' *E. aterrimus*.

My specimen of this very distinct species was taken at Dover by the late Mr. Leplastrier, and two were captured in a meadow near Twickenham, Surrey, June, 1827. I am also indebted to Mr. T. Marshall for a fine female, which he discovered, with twelve others and two males, last July, on a rush at Sandown, near Deal in Kent.

As I have now shown that three distinct species, belonging to different genera, have all been described to represent the *Elater aterrimus* of Linnæus, it must be borne in mind that at present the true type has not been detected as an inhabitant of our island; that the *E. aterrimus* of "British Entomology" is *apparently* a species unknown and hitherto undescribed, except in that work; and that the *E. aterrimus* of Stephens' "Illustrations" is the *E. puncto-lineatus* of the Zoological Journal. It is possible the two last may have been described in foreign works; but at present, not being able to ascertain that such is the case, I have identified them by adopting Mr. Pelerin's name for one species, and applying my manuscript name to the other.

I will now proceed to continue my remarks upon a few other species of *Elaters*, which are either but little known or have been described in miscellaneous works, where they have not met the entomological eye, especially upon the Continent.

Sp. 4. *Elater nigrinus*, Payk. iii. 89, 44. (Pl. II. fig. 4.)

Shining black, clothed with rather short depressed fuscous pubescence. Antennæ scarcely longer than the thorax (fig. *g*), basal joint clavate, second and third smaller, the former subglobose, the latter subovate, the following much broader, compressed and obtrigonate. Head convex (fig. *h*), rather coarsely punctured; clypeus subtrigonate and margined; trophi nearly concealed. Thorax semioval, convex, not very thickly punctured; anterior margin concave, angles projecting and acute; pectoral spine long, sharp and inflexed. Elytra a little broader than the thorax, and more than twice as long, tapering considerably beyond the middle, punctured, rugose when highly magnified, deeply striated. Legs slender, pitchy; tarsi long, very slender, simple, fibrous. Underside punctured.

3 & 4 lines long, 1¼ broad.

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My three specimens of this rare species were bred at Windsor, by Mr. C. Griesbach. This is the true *E. nigrinus*, which is included in the group comprising *E. sanguineus*, and the other scarlet and black species. They form the genus *Ampedus* of Dejean, but in Eschscholtz's works they represent the genus *Elater*.

Sp. 5. *Aplotarsus maritimus*, Curtis in "Annals of Natural History" for 1840, vol. v. p. 277. (Pl. II. fig. 5.)

Shining bluish black, sparingly and indistinctly pubescent. Antennæ much longer than the thorax (fig. *i*), basal joint stout, globose, second minute, the following compressed, elongated, obovate and truncate; third and fourth nearly of equal length. Head flattened, thickly but not regularly punctured, a circular impression above the clypeus, with a central channel; eyes not touching the thorax; clypeus semicircular, margined, not concealing the mouth; palpi clavate-truncate (fig. *k*). Thorax suborbicular, convex, thickly but faintly punctured, hinder angles prominent and very acute, pectoral spine elongate-conic, cup-shaped at the base, scutellum cordate. Elytra elliptical, depressed, broader than the thorax and more than twice as long, thickly and minutely punctured, and strongly striated. Coxæ and trochanters ferruginous and ochreous; legs slender, especially the tarsi, which are simple and pitchy, the fourth joint not very short.

2 lines long, $\frac{2}{3}$ broad.

I first discovered this very distinct little *Elater* under *rejectamenta* at Broughton, on the Lancashire coast; this was on the 30th June, 1827: the Rev. Mr. Little subsequently took it at Raehills, and I have heard it has also been found on Skiddaw, the end of April.

Mr. Stephens gives this as a doubtful variety of *Sericosomus brunneus;* it is therefore necessary to say that *A. maritimus* will not associate with that genus. It appears to be an *Aplotarsus*, and it approximates to *Elater rufipes* and *E. testaceus*, Fab.; both of which are included in the genus *Cardiophorus* by Dejean and Redtenbacher, but they have a very different habit to the typical species.

Sp. 6. *Cardiophorus formosus*, Curtis, in Ann. Nat. Hist. vol. v. p. 278. (Pl. II. fig. 6.)

Black, shining; head small, with variolated punctures; clypeus rounded, margined. Thorax entirely red, somewhat bell-shaped, thickly punctured like the head; the angles trigonate, but obtuse. Elytra scarcely twice as long, with firmly punctured striæ, very deep at the base; before the middle is a double crescent-shaped,

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pale ochreous fascia, and a straight and broader one towards the apex; the legs (at least the anterior) are red.

3⅓ lines long, 1½ broad.

This beautiful insect is nearly allied to the *Elater sex-punctatus* of Illiger, and the *Cardiophorus ornatus* of Dejean, both of which species inhabit Spain. My specimen of *C. formosus*, which I believe is unique, was given to me by Mr. Simmons. It was taken from the roots of some celery in a cottage garden near Wentworth House, Yorkshire. Unfortunately it was mutilated after being captured, by which accident the antennæ and some of the legs are lost.

Sp. 7. *Aplotarsus? cothurnatus*, Curt. MSS. (Pl. II. fig. 7.)

Elongate, narrow, shining black, not very thickly punctured, but clothed with very short, depressed, ochreous pubescence. Antennæ stoutish, scarcely longer than the thorax (fig. *l*), shorter in the female, basal joint clavate, second and third small, obovate-truncate; the remainder longer, compressed, elongate, obovate, truncated. Head semiglobose (fig. *m*), with a ridge down the centre, most evident in front; clypeus bent over the mouth, and forming a kind of lobe, coarsely punctured, not margined; palpi ferruginous, ovate, obliquely truncated. Thorax very convex, longer than broad, oval, truncated and broadest at the base, a short channel or impression behind the middle, base transversely depressed, the angles spreading, elongated, stout, trigonate and carinated; pectoral spine long, acute, with a central groove, dilated at the base; scutellum depressed, ovate-conic. Elytra elliptic, a little broader than the thorax and nearly thrice as long, depressed, deeply striate-punctate, the apex with a flattened margin. Legs testaceous, thighs pitchy, tips subcastaneous; tarsi simple and very slender.

4 lines long, and 1½ broad.

I possess a pair of this *Elater*, which was taken at Windsor by Mr. C. Griesbach. It appears to be undescribed, but it is allied to the *E. longulus* of Gyllenhal; and although at first sight it resembles *Limonius minutus* and its congeners, it does not belong to the same section, neither is it a true *Aplotarsus* I presume.

I have not yet had an opportunity of studying the genera of Eschscholtz, but from casual observations I am led to believe they are very arbitrary, and I therefore regret to see his system superseding the philosophic classification of Latreille, which was published in the third volume of the "Annales de la Soc. Ent. de France." I have elsewhere intimated that the larvæ exhibit several types of form which might possibly assist (when more generally

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known) in the arrangement of this fine family.* There are also characters to be derived from the trophi, the antennæ, the sternum and the feet, as shown by Latreille; and if the antennæ could be depended upon, it would be most desirable to make them a leading secondary character, as the mouth is often so concealed that without dissection it is impossible to get a view of the palpi. One objection apparently in adopting the antennæ to furnish generic characters is, that they not only vary specifically, but they differ in the sexes. Such being the case, the female antennæ must not be disregarded; and I expect, if well analyzed, many of the genera would subside into more useful sections. A monograph on the *Elateridæ* would be an enterprise that would well reward any one who had the leisure to undertake such a labour of love, if the task were executed faithfully. I believe no one at present has gone beyond parcelling the British species into somewhat imaginary groups; and the best sketch I have met with of the sections of our British species was published in Mr. Westwood's Modern Classification.

I will only add, as it may not be generally known to Entomologists, that in my Reports published in the "Journal of the Royal Agricultural Society of London," I have entered at great length upon the economy of the Wire-worms; and the better to illustrate their history, figures and elaborate dissections are given of them, as well as of ten species of *Elaters*, and several of their larvæ, with the parasitic insects which infest them in the wire-worm and the imago state.†

* Vol. i. 3rd Series, p. 43, Pl. 2, No. 3.

† Vol. v. p. 180—237, and Plates I and J. Vide also Morton's "Cyclopedia of Agriculture" and "Catalogue des Larves des Coléoptères," par M. F. Chapuis and M. E. Candèze, p. 141.

EXPLANATION OF PLATE II.

Fig. 1. *Ectinus aterrimus*, Linn.
1 *a*, the antenna; 1 *b*, front view of head.
Fig. 2. *Ectinus? gagates*, Curt.
2 *c*, the antenna; 2 *d*, front view of head.
Fig 3. Nov. Gen.? *puncto-lineatus*, Pelerin.
3 *e*, the antenna; 3 *f*, front view of head.
Fig. 4. *Elater nigrinus*, Payk.
4 *g*, the antenna; 4 *h*, front view of head.
Fig. 5. *Aplotarsus maritimus*, Curt.
5 *i*, the antenna; 5 *k*, front view of head.
Fig. 6. *Cardiophorus formosus*, Curt.
Fig. 7. *Aplotarsus? cothurnatus*, Curt.
7 *l*, the antenna; 7 *m*, front view of head.

N.B. All the figures are magnified and drawn from specimens in the Author's Collection; the cross lines showing the dimensions of the *Elaters*.

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IV. *Some Observations on the Excrement of Insects; in a Letter addressed to William Spence, Esq., F.R.S, &c.* By John Davy, M.D., F.R.S., Inspector-General of Army Hospitals.

[Read January 2nd, 1854.]

My dear Sir,

The excrement of insects has not, I believe, had that attention paid to it, chemically, which the subject deserves; especially taking into account the vast number of insect-species, how they abound, the manner in which they are diffused, or the part, as a class, which they appear to perform in the economy of nature. This too being your opinion as expressed in a letter with which you have favoured me, I am induced to collect and submit to you such results as I have obtained in a limited number of trials, with the request that you will communicate them to the Entomological Society, should they appear to be of sufficient interest to have the attention of that learned body.

The inquiry I commenced when I was in the West Indies, between 1846 and 1849, and have since continued from time to time as opportunities have offered.

I shall first bring under notice the results of the experiments made on the excrement of insects in their first stage of development, that of the larva or caterpillar. Even at the risk of being tedious, for the sake of accuracy, I must be more particular than I could otherwise wish, and shall have to describe individual instances. I have to express regret at the same time for my inability, without aid in those distant colonies, to give the specific names of the specimens which yielded the excrementitious matter examined.

1. The caterpillar of a butterfly, resembling *Papilio Aphrodite*, Linn., common in Barbados, in December, voided excrement in abundance when actively feeding, in the form of little green pellets. A certain quantity of these, dried and acted on by proof spirit, yielded a residue on evaporation, in which hippuric acid, or a matter having similar properties, was detected; thus, to mention one, with muriatic acid, on slow evaporation, it afforded prismatic crystals, shooting from a centre, and which did not deliquesce in a moist atmosphere.

2. A large caterpillar of a moth, resembling *Sphinx Atropos* when voraciously feeding, voided much excrement in the form of

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cylindrical masses of a dark olive green, some of which were partially covered with a yellowish crust. The matter of this incrustation was found to be chiefly lithate of ammonia. Under the microscope it was seen to consist of spherical granules, most of them about $\frac{1}{10000}$ of an inch in diameter; these were dissolved immediately in dilute nitric acid, and when heated (a drop of the solution being placed on a slip of thin glass), acquired the rich purple hue characteristic of lithic acid under this treatment.

3. A large caterpillar of a *Sphinx*, after it had ceased feeding, about to assume the chrysalis state, put under a glass cover, in less than twenty-four hours parted with its enveloping integuments, and became completely incased; in doing so, it voided a good deal of brownish fluid. This, tested for lithic and hippuric acid, afforded no traces of the former, but pretty distinct ones of the latter.

4. Another large caterpillar of a *Sphinx*, in a state very similar to that of the preceding, was very restless in confinement, and shortly voided some dark fluid excrement, which, on examination, gave results like those last mentioned.

This caterpillar was killed by immersion in spirits of wine. Opened, its stomach was found to be the most conspicuous organ; it extended nearly the whole length of the abdominal cavity, and was distended with a dark, mucous fluid. Under the microscope a tubular structure was seen contiguous to it, and connected with it. Conjecturing that these tubes might be renal ones, the part was taken out, and digested in water, to which a little nitric acid had been added: the solution formed was found to contain lithic acid; thus a drop of it evaporated, and heated on a support of thin glass, acquired the rich purple tint distinctive of this acid.

5. A large caterpillar of another species of *Sphinx*, taken from the leaves of the sweet potatoe on which it was feeding voraciously (in confinement still feeding), voided a great deal of almost black excrement, in cylindrical masses, rounded at their ends. On none of them was there any appearance of incrusting matter, as in the instance No. 2. They yielded a brownish solution to proof spirit; and this evaporated, afforded an extract, which, with nitric and muriatic acid, afforded crystals, some of them of the form of hippuric acid similarly combined.

6. A silk worm actively feeding on mulberry leaves voided excrement in the form of small black pellets: on one of them there was a brown incrustation; this, agitated with a drop of water, rendered the water slightly turbid. Under the microscope it exhibited granules; these were soluble in dilute nitric acid, and afforded,

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when evaporated and heated, a slight but distinct trace, in the color produced, of lithic acid.

These few are all the trials I have to notice on the excrements of larvæ. With the exception of the last, in this country, they were all made in Barbados.

The next I have to mention were on the excrement of the perfect insect, immediately after quitting its puparium; these likewise were made in Barbados.

7. The pupa of the caterpillar, number 1, I may premise, occurs attached by a fine, short thread and hanging perpendicularly. Before the escape of the imago the color of the chrysalis changes from apple green to a dull blue, passing into brown; becoming when empty of a light grey. On quitting its case the butterfly adheres to it, its head upwards, its wings hanging down. Thus it remains motionless, with the exception of occasionally expanding its wings, till the intestine has been unloaded, fitting it for flight, secure from its position of not being soiled in the slightest degree by what it voids. The discharged matter I have found to vary in different instances, and this at the same season, and when voided by individuals similarly reared, and detached from the same shrub. The excrement of one was a turbid liquid of a purplish hue, as if tinged by the purpurate of ammonia. Under the microscope, there were to be seen purple patches, some colorless rhomboidal plates, as if of lithic acid, and numerous granules, as of lithate of ammonia. By the test of nitric acid and heat, manifest proof was obtained of the presence of lithic acid, a strong purple color being produced. The excrement of another was of a brownish hue, and turbid. In it were detected traces of hippuric acid, of lithic acid, and of urea, judging from the form of the crystals obtained from an alcoholic solution, from the effect of nitric acid, and of that of this acid and of heat. The excrement of a third, also a brownish fluid, appeared to contain little else than hippuric acid, with perhaps a trace of urea. The extract obtained from the alcoholic solution of the dried matter emitted, on the addition of nitric acid, an odour like that of the urine of the horse, and afforded crystals on evaporation similar to those from the same urine when treated in like manner.

8. A *Sphinx* from the larva number 4, on quitting its puparium voided a considerable quantity of brownish turbid fluid. This excrement afforded distinct traces of lithic acid in the form of lithate of ammonia, and also of hippuric acid; the former in suspended granules, the latter in solution. The lithic acid was indicated by the effect of nitric acid and heat; the hippuric acid

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by the crystals obtained on evaporation after the addition of muriatic acid. On this addition being made, a smell was perceived like that from the urine of the horse. The *Sphinx* shortly after, and before it had taken any food, was killed and examined; its stomach and intestine were found empty.

9. A *Sphinx* from larva, No. 3, less than a month in undergoing its metamorphosis, voided, on leaving its puparium, a good deal of turbid, reddish-brown fluid, which, subjected to examination, was found to contain lithate of ammonia, a trace of the purpurate of ammonia and of hippuric acid. Under gentle pressure, when laid hold of, this *Sphinx* discharged pretty much semifluid matter of a brick red color, which, under the microscope, was found to be composed of spherical granules, varying in diameter from $\frac{1}{12000}$ to $\frac{1}{15000}$ of an inch. After standing a little while many of them coalesced and formed larger granules. Tested by nitric acid and a regulated heat, they had the character of lithate of ammonia. I may mention further, that in the forsaken puparium there was a good deal of whitish matter; this washed out with water and collected, under the microscope was seen to consist of granules of about $\frac{1}{10000}$ of an inch in diameter; and tested, was found likewise to be of lithate of ammonia. The quantity of excrement accumulated in this moth during its change of state, and voided on acquiring its perfect form, was truly surprising, and not less so the abundance in it of lithate of ammonia.

I shall now pass to the results obtained from insects caught, and consequently of uncertain age in relation to their last birth or time of quitting their puparia.

10. A *Sphinx*, after about twenty-four hours' confinement, under glass, with a free supply of air, died without yielding any excrement. On opening it the lower portion of its intestine was found distended with a brownish opaque fluid. The opaque matter, it may be inferred, was lithate of ammonia; for under the microscope it exhibited the finely granular condition of this compound, and when acted on by dilute nitric acid and heat, was first dissolved, and then acquired the rich purple color distinctive of lithic acid.

On examining the abdomen, opening the *Sphinx* under water, some minute cells, with delicate tubes proceeding from them—part I believe of the renal apparatus—were observable by means of the microscope; they contained an opaque matter, probably lithate of ammonia, for, tested for lithic acid, proof was obtained of its presence.

Whilst in Barbados other large moths of the *Sphinx* tribe were

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caught and placed in confinement; I have notes of six. From all of them either excrement was voided during life, or was found in the intestine on examination after death, and of a nature similar to that last mentioned, composed chiefly of lithate of ammonia. No other solid substance, no crystals were observable when submitted to the microscope. In one, as in the instance last described, on opening the abdomen some delicate tubes were seen ramifying on the intestine externally. These too contained an opaque whitish matter, which, from the effect of nitric acid and heat, appeared to be lithic acid; but, more probably, was lithate of ammonia.

11. A yellow butterfly, in confinement, voided a little semifluid brownish excrement. Seen under the microscope, diluted with water, it exhibited many well formed rhomboidal plates, or low prisms, as if of lithic acid, with which were intermixed minute granules, as of lithate of ammonia. Acted on by nitric acid and heat the purple tint was produced indicative of lithic acid.

12. A black beetle, with suckers or cushions to its feet and claws, voided a considerable quantity of fawn-colored matter, in little grains about the size of mustard-seed. By the same test as the preceding they were found to consist chiefly of lithate of ammonia. No appearance of crystals was seen under the microscope.

13. A *Mantis* (*M. bicornis*, Linn.), in confinement, yielded a minute portion of excrement. This, mixed with a little water on a glass support, exhibited under the microscope a few minute rhomboidal crystals, and, acted on by nitric acid and heat, acquired a pink tinge, denoting the presence of a little lithic acid.

14. A fire-beetle (*Lampyris ignita*, Linn.) voided, in confinement, a little brownish excrement. It appeared under the microscope to consist chiefly of epithelium-scales and of granules; the latter, of lithate of ammonia, being dissolved instantly by dilute nitric acid, and acquiring when heated the color marking lithic acid.

15. A light yellow moth, during the night, in confinement, voided a large quantity of excrement, that is, large in proportion to the small size of the insect: it was white and semifluid. Under the microscope it was found to abound in granules of about $\frac{1}{3000}$ of an inch in diameter; they were completely dissolved by dilute nitric acid, and afforded on evaporation when heated the rich purple hue distinctive of lithic acid.

16. A brown moth, with white spots, weighing 1·6 grain, voided

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a good deal of excrement in confinement, some portions of which were whitish, some reddish. In the former, under the microscope, a few crystals were seen, as of lithic acid, and numerous granules, about $\frac{1}{3000}$ of an inch in diameter, as if of lithate of ammonia. The latter contained no crystals, only granules. Heated with nitric acid, lithic acid was strongly indicated in both.

17. A brown moth, of a lighter color than the preceding, of about the same size, voided a pretty copious fawn-colored excrement, which, mixed with water, under the microscope exhibited aggregated masses as if formed of granules, and some crystals, square plates, and one low four-sided prism. The granulated masses and crystals dissolved in nitric acid, and the rich color, the mark of lithic acid, was produced by exposure to a regulated heat.

18. A dark brown moth, of medium size, in confinement during twenty-four hours, voided a good deal of reddish excrement, partly in minute granules, and partly in little masses, probably aggregates of the granules; such they appeared under the microscope. No crystals were seen. By the nitric acid and heat test, lithic acid was found to abound. Twenty-four hours longer in confinement this moth was found dead, after having voided a good deal more of red excrement, like the preceding, excepting that in one small portion of it crystals of lithic acid (hexagonal and quadrangular plates) were observable. The nitric acid test gave the same result as the last.

19. A small white moth, that died after being confined twenty-four hours, voided a pretty considerable quantity of semifluid, almost colorless excrement, composed chiefly of granules, which, from the action of nitric acid, it may be inferred were of lithate of ammonia.

20. A small grey moth voided a minute portion of brownish excrement, consisting, as seen under the microscope, of little granular masses, and dispersed granules without crystals: from the effect of nitric acid and heat it would appear that they were composed principally of lithate of ammonia.

21. A brown moth, about half an inch in length, in confinement, before it died voided a portion of excrement so minute in quantity that it was not easy to collect; notwithstanding, it afforded satisfactory proof of the presence of lithic acid by the nitric acid test. The rich distinctive hue was visible to the naked eye, and well shown under the microscope.

22. A delicate white moth, with a tufted tail, deposited in con-

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finement three portions of semifluid excrement, each similar, composed chiefly of granules of about $\frac{1}{3000}$ of an inch in diameter, which, by the test of nitric acid, appeared to be of lithate of ammonia.

23. A large butterfly supplied with syrup, which it sucked up greedily, voided a drop of fluid excrement of a light brownish hue. This collected with care, after having been diluted with water to increase its bulk, was allowed to evaporate spontaneously on a glass support. Thus prepared, seen under the microscope, it exhibited in a transparent medium some minute plates and fine granules. A very little dilute nitric acid was added; on its evaporation stellaform groups of crystals appeared, reminding of nitrate of urea, and there was a urinous smell, not unlike that from human urine with nitric acid. Heated carefully the purple hue indicative of lithic acid appeared in specks fading from them as centres.

24. A black beetle common in Barbados, about half an inch in length, of impetuous flight, striking against objects, when it enters a room at night, with a force, considering its size, almost incredible, in confinement voided a large quantity of very light fawn-colored excrement, in a semifluid state. It was composed of spherical particles from $\frac{1}{6000}$ to $\frac{1}{8000}$ of an inch in diameter, as seen under the microscope, without crystals or any other form of matter. Tested, it was found to contain lithic acid, and, it may be concluded, in combination, as lithate of ammonia, for it dissolved more readily in hot than in cold water, the hot solution in cooling becoming slightly turbid, and the extract obtained on evaporation, after filtration, acquiring when heated with nitric acid the characteristic color due to lithic acid.

25. A brown grasshopper, found amongst Guinea-grass, in confinement, voided two kinds of excrement: one, it may be inferred, fæcal, in small cylindrical masses, almost black; the other urinary, at least in part, of the same form, of a light fawn-color. These, the latter, dissolved without effervescence in dilute nitric acid, and acquired, when the solution was evaporated and subjected to a regulated heat, the color denoting lithic acid.

26. A field-cricket, in confinement, voided some excrement in small black pellets, in which no lithic acid could be detected, and which was probably altogether fæcal. Bread was given, which it ate freely. During the following twenty-four hours it voided more excrement: some, like the preceding, black; some in oval pellets, smeared with a semifluid matter, brown and with a urinous odour. These, broken up and diluted with water, ex-

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hibited, under the microscope, spherical granules, as of lithate of ammonia, globules like those of starch, and which were colored blue by tincture of iodine, and irregular fragments as of vegetable matter. The presence of lithic acid was detected by the usual test. It was tested for urea; but the presence of this substance was not demonstrated, which may have been owing to the smallness of the quantity subjected to experiment.

27. A cock-roach just killed, taken from the apothecary's store room, was found, on being opened, to have its stomach and intestine distended with small dark fragments, amongst which were some possessing the color and lustre of Spanish flies. A system of tubes, containing a white opaque matter, was seen on each side, and at right angles to the intestine. This matter examined was found to contain lithic acid, and was probably in combination with ammonia.

28. A large dragon-fly, in confinement, voided pretty much reddish excrement, which, under the microscope, appeared in little aggregate masses, with (when broken down and diffused in water) some very thin colorless and transparent hexagonal plates. It dissolved in part in nitric acid, and heated acquired a rich purple color.

29. Another dragon-fly, a smaller species, voided in confinement several small cylindrical masses, in part brick-red, and in part blackish. Broken and mixed with water, under the microscope they appeared to be composed of the *debris* of insects, portions of wings, legs, &c., and of granules. Acted on by dilute nitric acid, a partial solution was immediately effected, in which lithic acid was clearly detected by the ordinary test.

30. A large *Mantis* (*M. Siccifolia?* Linn.), in confinement, voided a good deal of excrement in small pellets, some blackish, some brown. The latter, under the microscope, after admixture with water, showed numerous granules larger than those of lithate of ammonia commonly are, being about $\frac{1}{200}$ of an inch in diameter, yet having the properties of this compound, as tested in the ordinary way.

31. A large humble-bee, its prevailing color black, in confinement voided pretty much excrement in a semifluid state. Under the microscope it appeared to consist chiefly of corpuscles, reminding one of the pollen of flowers. Acted on by dilute nitric acid and heat, the presence of a little lithic acid was demonstrated.

32. Several wasps, together with their comb, placed under a glass shade, were found dead on the fourth day of their confine-

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ment, after having voided some excrement, in which lithic acid was detected by the ordinary test. During the first two or three days it was remarked that they fed on their comb.

The cells of the comb contained larvæ nearly in a state to pass into the perfect form. One taken out and killed was examined. Its intestine, the lower portion, was found full of a chalk-like matter, which on examination proved to be lithate of ammonia.

The comb, freed from the old wasps, was placed on a clean plate and covered with a glass shade. In a few hours a young wasp made its appearance, having broken down the lateral portion of its cell. It soon voided some excrement, which was of two kinds, one almost black, of an offensive smell, a kind of meconium; the other of a light fawn color. This, the latter, had what appeared mucous covering, within which was a fluid, and in that a little mass of soft consistence, about the size of a barleycorn. The fluid was brownish and transparent; with nitric acid it emitted a smell like that from impure urea or human urine similarly acted on. The included little mass was found to consist principally of lithate of ammonia.

33. Several flies, such as are common in Barbados within doors, somewhat smaller than the common English house-fly, voided in confinement a little semifluid excrement. By the ordinary means a distinct trace of lithic acid was detected in it. The liquid part afforded indications of urea, yielding a honey smell on the addition of nitric acid, and minute crystalline plates on evaporation in sunshine, which deliquesced in moist air.

34. Musquitos. These insects, averse to light, harbour in dark places; the case of my microscope was a favourite place of resort: its brass stand became spotted with their minute droppings, so minute, indeed, as hardly to be distinguishable without a magnifying glass. The specks were nearly of the same size and appearance, except that some were darker than others. A good many of each color were collected; heated apart with nitric acid, both proved rich in lithic acid, judging from the purple color produced.

A single musquitoe was confined under a wine glass, inverted on a porcelain plate. Shortly after, on careful examination with a magnifying glass, a speck of excrement was detected of a light color and semi-globular form, as if voided in a semifluid state. Removed carefully to a slip of thin glass, and nitric acid added, it dissolved completely, and cautiously evaporated and heated, a distinct mark of the presence of lithic acid was obtained; there was a circular patch of a bright rose-hue, which was dissolved by

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water. A single musquitoe weighed was found equal to about ·008 of a grain. The balance used was a delicate one, of Robinson's construction.

35. A large fly (four white bars on its thorax, white spots on abdomen, yellow about the eyes), in confinement, voided some excrement, partly in small cylindrical masses of a fawn color, partly spread out and semifluid, of a light brownish hue. In the former, under the microscope, two forms of crystals were seen; one like those of lithic acid; the other like those of ammoniaco-magnesian phosphate. In the latter, granules only were seen. Both acted on by nitric acid and heat, afforded proof of the presence of lithic acid.

36. A mason-bee, in confinement, voided a very minute portion of excrement, semi-transparent, semifluid, and of a brownish hue. By the usual test, it was found to contain lithic acid.

37. An elegant beetle with cushioned feet, in confinement, voided several small pellets, some of them with a brownish incrustation. These, the incrusted ones, acted on by nitric acid and heat, afforded distinct traces of lithic acid. Examined under the microscope, they appeared to be composed principally of vegetable matter. In those without incrustation, and of a darker hue, no lithic acid could be detected; they were, probably, entirely fæcal.

38. A brown speckled moth, its wings spotted white, in confinement voided a comparatively large quantity of brownish excrement of soft consistence. Under the microscope, fine granular matter—the granules about $\frac{1}{3000}$ of an inch in diameter—were observable, and many crystals; of these, some were reddish brown, some colorless; some, the majority, were rhomboidal plates of moderate thickness; others nearly cubical; one plate, a colorless one, was hexagonal. They varied in size; they were large microscopical objects as seen with an $\frac{1}{8}$th inch glass. A drop of nitric acid added, the granules were instantly dissolved, the crystals slowly. The solution evaporated and heated, acquired a rich purple hue. The granules, it may be inferred, were of lithate of ammonia; the crystals, probably, in most part, of lithic acid.

All these observations on perfect insects, with one exception, were made in Barbados; the single exception was that on the fire beetle, which was made in Trinidad. The observations which I am now about to offer were made in this country, and the greater number of them in the neighbourhood of Ambleside. In recording these latter results, I have had the advantage in most instances of being able to assign correct names to the insects, their

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species having been determined by Francis Walker, Esq., and by J. W. Douglas, Esq., who, at your request, were so obliging as to examine them.

39. A butterfly (*Vanessa Urticæ*), on pressure being applied to its abdomen when in a torpid state (it had been caught on the wing), a comparatively large quantity of semifluid excrement was ejected, of a rose color, as if from the presence of rosacic acid. Under the microscope it was seen to be very uniformly composed of spherical granules, of about $\frac{1}{1000}$ of an inch in diameter. It dissolved immediately in nitric acid, and when evaporated and heated, acquired the rich purple hue indicative of lithic acid, or of lithate of ammonia.

40. Another butterfly, of the same kind, voided in confinement a small quantity of reddish excrement; in which, besides granules, as of lithate of ammonia, rhomboidal plates, more or less truncated at their angles, probably of lithic acid, were seen under the microscope. The granules dissolved rapidly in dilute nitric acid; the crystals slowly. The whole when evaporated and heated acquired the color indicative of lithic acid.

41. A *Vanessa Io*, in confinement, voided some greyish excrement, which under the microscope, and the action of nitric acid and heat, was found similar to the first of the two preceding instances.

42. A moth (*Smerinthus Populi*), in confinement, voided pretty much reddish excrement, which was found to consist principally of lithate of ammonia.

43. Another moth (*Crambus culmellus*), pressure being applied to its abdomen, a minute quantity of light colored excrement was discharged, which, on examination, proved similar to that last mentioned.

44. A moth (*Triphæna pronuba*), in confinement, voided a good deal of fawn-colored excrement. Under the microscope, it exhibited spherical granules, as of lithate of ammonia, with which were intermixed low four-sided prisms or cubes of a pretty large size. Acted on by nitric acid and heat, the rich purple, marking lithic acid, was produced.

45. Another moth of the same kind as the last, in confinement, during one night voided excrement in three separate portions; one reddish, one brown, one of a fawn color. They were found to consist principally of lithate of ammonia. On pressing the abdomen of this moth, a reddish brown fluid was obtained, which had the smell of human urine, and which was changed to a honey smell on the addition of a little nitric acid. On slow evaporation

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the solution yielded crystalline forms, rhomboidal plates, resembling those of nitrate of urea.

46. A moth (*Cerapteryx graminis*) voided no excrement in confinement. After its death, the anal portion of its abdomen was detached and digested for a few minutes in dilute nitric acid; the solution, evaporated and exposed to a graduated heat, afforded a faint but clear trace of lithic acid.

47. A fly (*Anthomyia platura*), in confinement, voided a minute portion of excrement; which, on examination, was found to consist principally of lithate of ammonia.

48. Another fly (*Calliphora vomitoria*), in confinement, voided a very little excrement, which was ascertained to be like the last.

49. A butterfly (*Pontia Napi*) yielded in confinement some excrement; found to consist chiefly of lithate of ammonia.

50. Two cow-dung flies (*Scataphaga stercoraria*), in confinement, voided a little excrement in reddish patches, which, under the microscope, exhibited the usual granular appearance of lithate of ammonia, the granules about $\frac{1}{1000}$ of an inch in diameter, and was similarly acted on by nitric acid and heat.

51. Several small flies (*Musca rudis*), in confinement two or three days, voided pretty much greyish excrement deposited in patches. Under the microscope, after being diluted with water, it exhibited, in addition to granules, some prismatic slender crystals, as of phosphate of lime, and some scales, as of epithelium. Acted on by nitric acid and heat, proof was obtained of the presence of lithic acid.

52. A honey bee (*Apis mellifica*) died in confinement without voiding any excrement. On pressing its abdomen a colorless drop of fluid was obtained, in which a trace of lithic acid was detected.

53. Three bees, taken from their hive in October, presently died at a temperature of about 40° Fahrenheit. The anal portion of the abdomen of each was separated and digested in dilute nitric acid; on evaporating the solution at a graduated heat, a trace of lithic acid was detected.

54. A wasp—the common English wasp—which in confinement voided no excrement, yielded after death, the abdomen being pressed, a drop of fluid, in which, under the microscope, a few granules were seen, as of lithate of ammonia, and in which a trace of lithic acid was found by the ordinary means.

55. A beetle (*Geotrupes sylvaticus*), in confinement, during one night voided many small cylindrical masses of a brown color, with

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a sprinkling of a matter on their surface of a lighter hue. One broken up, mixed with water, under the microscope exhibited minute granules, as of lithate of ammonia, particles of an irregular form, as of earthy matter, a few forms as of infusoria, and fibres, &c., as of vegetable matter. The pellets, digested in dilute nitric acid, separated into smaller ones, seeming to show casts of the intestines. The solution (the greater portion of the excrement remaining undissolved), evaporated and heated, afforded proof of the presence of lithic acid.

After having been killed by the vapor of camphor, an opaque filament was seen adhering to its anal extremity. This, digested in water and slightly agitated, under the microscope exhibited granules like those of lithate of ammonia, with a filamentous substance, probably mucus. The granules, about $\frac{1}{10000}$ of an inch in diameter, were immediately dissolved in dilute nitric acid, and on the application of heat the purple hue was produced denoting lithic acid.

56. A beetle (*Geotrupes stercorarius*), in confinement, voided some excrement of a soft consistence, and nearly white, which was found to consist principally of lithate of ammonia. Killed by immersion in water, and opened, white vessels were seen on the intestine containing an opaque matter, which, tested by nitric acid and heat, proved to be lithic acid or lithate of ammonia.

57. A beetle (*Blaps mortisaga*), in confinement, voided some excrement in the form of pellets of a dark grey colour, partially covered with a crust of lighter hue. Broken up and mixed with water, under the microscope the prevailing color was light greenish, from vegetable matter in fragments, amongst which were interspersed many granules, as of lithate of ammonia. Digested for a short time in dilute nitric acid, and the solution evaporated and heated with care, proof, in the color produced, was obtained of the presence of lithic acid.

58. A female *Telephorus pilosus* voided in confinement a little excrement, which was found to consist principally of granular lithate of ammonia.

59. A male *Telephorus Melanurus* (?) taken in company with the preceding, and in the act of coitus, died in confinement without voiding any excrement. The anal extremity detached, acted on by nitric acid and heat, afforded a trace of lithic acid.

The trials on the four following insects were made about twelve months after their death, kept, put by in a drawer, without any care; they were some of those on which experiments had been tried to show the effects of different agents on insects, as described

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in a letter which I had the honour to address to you in April, 1851, and which was published in the Transactions of the Entomological Society for the same year.

60. Of a *Musca lanio* the anal portion was cut off, and digested in dilute nitric acid; the solution formed, carefully heated gave a distinct trace of lithic acid in the color produced.

61. A *Musca domestica*, similarly treated, afforded a like result.

62. A *Musca stabulans*, the like.

63. A fly (*Heteromyza buccata*) yielded a very slight trace of lithic acid, requiring microscopic examination to distinguish the color.

64. An *Eristalis tenax* afforded a slight but yet a distinct trace of the acid.

On these, the preceding observations, having now described all I have to offer, I would beg to make a few remarks in conclusion.

Considering the properties of the excrementitious matter examined, I apprehend it may be admitted that in almost every instance a part of it, and in most instances the larger portion, was urinary,—a renal secretion.

Adopting this conclusion, the urine of the insects in their earlier stage, their larva state, would appear to differ considerably from that of the same insects in their imago or perfect form. Thus, whilst in the latter it was found to consist chiefly of lithate of ammonia, in the former lithate of ammonia was sparingly detected, or not at all; what seemed to be hippuric acid being more abundant. Should further inquiry be confirmatory of this, will not an interesting analogy be established, viz. of one, the perfect insects, in their urinary secretion, to birds, which they resemble in so many other particulars; of the other, the insects in their larva state, in relation to the same secretion, to the mammalia, to which also, especially in their mode of feeding, they bear a certain resemblance—a resemblance that may be traced through several orders, according to their diet? Even in their transition state, that is, when passing from the larva to the imago, comparing the pupa of the insect with the excluded ovum of the bird, the analogy seems to be sustained—both, in the process of hatching to evolve the perfect animal, being independent, with the exception of atmospheric air, of any external material supply. The renal secretion of the fœtal bird is, I believe, always lithate of ammonia; at least, I am not aware that any other has yet been detected. In the insect we have seen how, when fully formed and quitting its puparium, the same compound has abounded.

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The proportional quantity of the urinary secretion of birds, and the large quantity of lithate of ammonia which exists in it,—is indeed its principal part,*—is remarkable;—we have proof of it, whether we examine the excrement of any single bird, or direct our attention to the immense beds of guano, of which the urine of birds, variously changed, appears to be the chief ingredient. Nor is the urine of insects in relation to quantity less remarkable. In examining it, I have often been surprised at its abundance. In my notes, when mentioning the excrement of the moth, No. 16, which weighed little more than a grain and a half, I find the remark, that its excrement exceeded in quantity—it was similar in kind—that of a humming-bird which I was examining at the time, and which weighed 92·5 grains. The musquitoe, and its urinary secretion, may be adduced as another illustration, as well as of the delicacy of the test employed to detect the organic acid. In your letter to me, that already referred to, adverting to the importance of insects in the economy of nature, after noticing their number, how probably 250,000 species may be estimated to exist, you specially point to one function of this great class,—the eating of plants and the converting them into animal matter fit for the food of birds, fishes, &c. Another part, in harmony with this, may be pointed out, viz. how by their excrement, especially the urinary portion of it, they contribute to manure and fertilize the earth for the production of plants, on which so many of them depend for a subsistence. We have seen in the examples last given—the four last—that the peculiar urinary secretion may be detected in the dead insect, after many months, in accordance with the character of lithate of ammonia. This quality of endurance, I need hardly remark, fits it admirably for a persistant manure.

I am,

My dear Sir,

Yours very truly,

JOHN DAVY.

Leaketh How, Ambleside,
Dec. 17, 1853.

* Without any exception, I believe the urinous secretion of birds is principally lithate of ammonia. I have found it such in every instance that I have examined it, whatever the kind of food; in the instance of the graminivorous birds, such as the goose and the swan, the lithate incrusts the fæcal excrement commonly much in the same manner as I have found it incrusting the same excrement from beetles.

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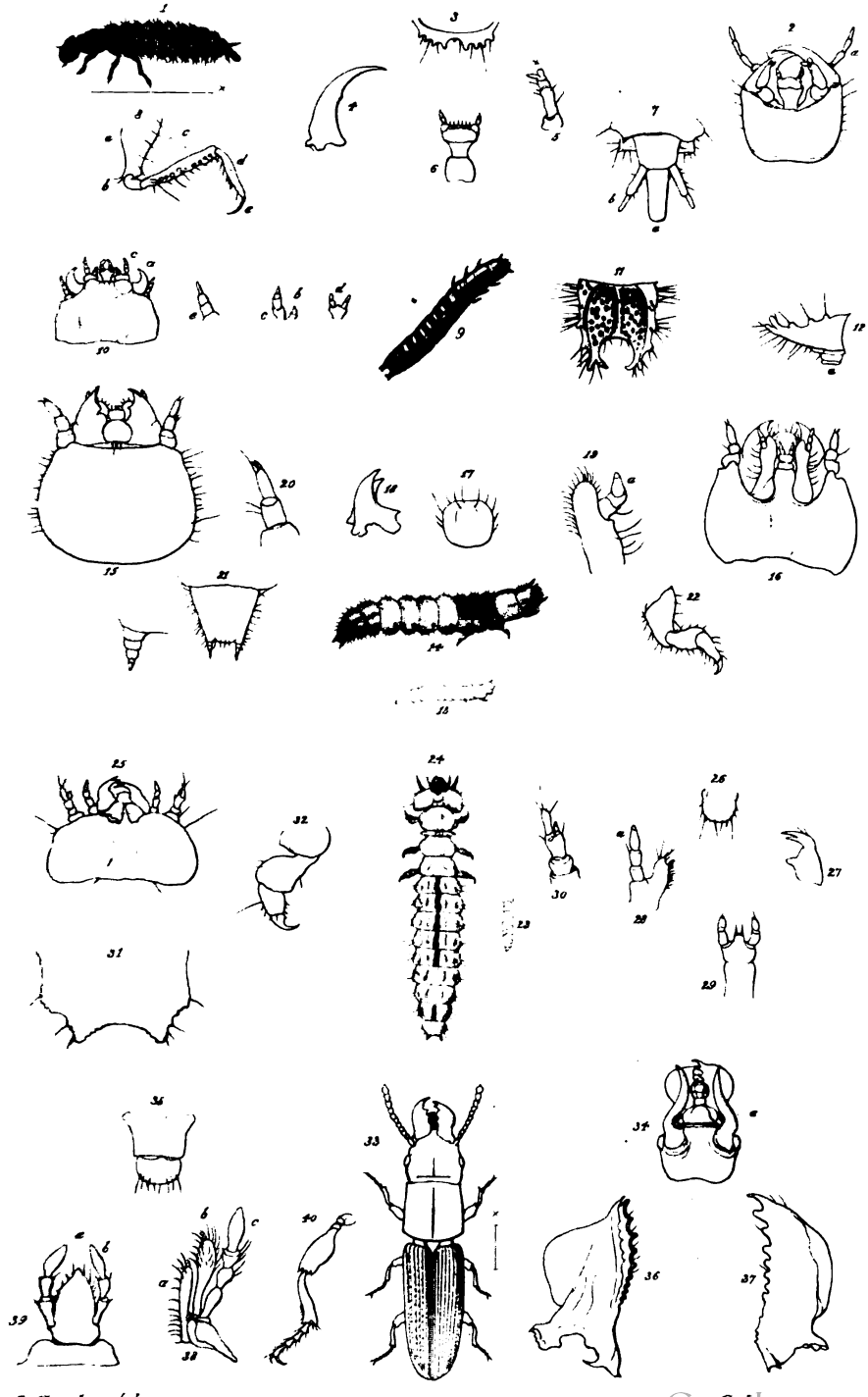

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V. *Descriptions of some Coleopterous Larvæ, &c.* By John Curtis, Esq., F.L.S., &c.

[Read 3rd April, 1854.]

I have the pleasure of calling the attention of the Entomological Society to a few interesting larvæ, of which hitherto no figures have been published, with the exception of one species.

The very excellent and useful volume which lately issued from the press at Liege* will greatly assist in the investigation of the larva-state of the *Coleoptera;* and the figures there given, from the pencil of one of the authors, add greatly to the value of the Memoir.

It is not however in the grouping of genera, I expect, that so much benefit will be derived from a knowledge of the larva of insects as was at one time anticipated; we need only take a glance at the *Papilionidæ* to be convinced, that instead of unity there is frequently as great a difference amongst themselves as can be exhibited between that natural family and any other belonging to the order *Lepidoptera.*† I am, however, far from rejecting the larvæ in systematic arrangement, when their forms assist in combining groups, whether of families or genera. The great value which attaches to a knowledge of the economy of insects arises from its connection with the economy of the human species, whether we consider insects as the enemies or benefactors of man; destroying the hopes of the agriculturist and the gardener, or supplying the *staple* in the arts and manufactures.‡

Family STAPHYLINIDÆ.

Genus Velleius. (Plate V. fig. 1.)

Sp. 1. *V. dilatatus*, Fab.

Elongated, but slightly depressed, narrowed anteriorly, smooth, sparingly clothed with short hairs. Head oval, depressed (fig. 2,

* Catalogue des Larves des Coléoptères, par M. F. Chapuis et M. E. Candèze. 1853.

† Vide the larvæ of our two species of *Papilio*, *Podalirius* and *Machaon*, the genus *Acronycta*, &c.

‡ From the able and long-continued experiments of my friend Dr. Chavannes of Lausanne I expect some very important discoveries will result. He has been able, if I mistake not, to obtain as good and fine silk, as that from the common silk-worms, from the cocoons of caterpillars, which are larger and much hardier in their nature than those from China.

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underside); eyes invisible; clypeus deeply indented, forming eight teeth, with a ninth in the centre, and several long rigid hairs (fig. 3); mandibles crossing, long, slender, curved and very acute (fig. 4); maxillæ forming a long horny lobe, arising from a stout scape, terminated by a claw internally. Palpi triarticulate? (fig. 5, with the palpus broken). Mentum horny, narrowed at the middle, terminated by a large ciliated lip, with a minute biarticulate palpus, attached to a stout scape at each angle; basal joint oblong, second conical (fig. 6). Antennæ inserted on each side of the clypeus, not very remote, slender and four-jointed (fig. 2 *a*). Prothorax attached by a short neck, a little broader than the head towards the base, subquadrate, the anterior angles rounded; two following segments a little broader, transverse. Abdomen soft and nine-jointed, with eight distinct stigma, ochreous-white, broader than the trunk at the middle, tapering towards the extremity, each segment having an oval fulvous spot on each side, forming two rows down the back; these spots are punctured, with minute tubercles, and there are several punctured ferruginous tubercles on the hinder margin of each spot; terminal segment conical (fig. 7), producing a drooping cylindrical ochreous pro-leg (fig. 7 *a*), with a jointed divaricating style on each side at its base; first joint long and stoutish, second shorter and slender (fig. 7 *b*). Legs long, slender, spiny (fig. 8, a middle leg); coxæ large, trochanters small, thigh long and very spiny beneath; tibia shorter and slenderer, but spiny inside; claws long, slender and very acute.

The following is Professor Henslow's account of this larva:—"I took about thirty or forty specimens of *Velleius* from the hornet's nest, by placing a bowl under it, into which most of them fell within a month of the time after it had been brought home (18th October). Some I picked off the lowest and exposed lamina of the comb, as they were actively traversing it, and poking their heads into the cells in search of food; most of these were placed in a glass jar among rotten wood in a powdered state. They burrowed in this, and I could see many of them alive in March, each in a separate cavity, which he had formed for himself against the bottom or side of the jar. I am sorry, and rather ashamed to say, that my over-care for their welfare destroyed them. Thinking they were getting too dry, I poured in a little water once or twice, and, after an absence of three or four days on one occasion, I found they were dead."*

* The Zoologist, vol. vii. p. 2585.

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This unfortunate accident not only deprived many a cabinet of this fine beetle, but we have no direct evidence of the larva being the offspring of *Velleius*, although, from its economy and its organization, it is scarcely to be doubted. My friend Professor Henslow kindly forwarded to me specimens, but, having died before they were put into spirits, they were mutilated, which renders my magnified figures and dissections somewhat imperfect, and possibly not entirely to be relied upon in a few minor points.

Family ELATERIDÆ.

Genus Athous. (Plate V. fig. 9.)

Sp. 2. *A. rhombeus*, Oliv.

Long, linear, plano-convex, with a channel along the back; pitchy, shining, with a few longish hairs. Head depressed, wedge-shaped, semiorbicular (fig. 10); eyes none; clypeus with a conical tooth in the centre; labrum undiscovered; mandibles meeting, arched and acute (fig. 10 *a*); maxillæ broad at the apex, and terminated by a minute, biarticulate, palpiform lobe (fig. 10 *b*). Palpi short and 4-jointed, basal joint the largest; 2nd smaller, both subobovate, truncated; 3rd smaller, cup-shaped; 4th very small, and somewhat conical (fig. 10 *c*); mentum chalice-shaped, with a slender biarticulate palpus at each angle (fig. 10 *d*). Antennæ inserted at the base of the mandibles, on each side of the crown of the head, 4-jointed, basal joint short; 2nd quadrate; 3rd oval; 4th very slender and as long as the 3rd (fig. 10 *e*). Prothorax quadrate, two following segments transverse, punctured at the base, the membrane between the segments forming whitish bands. Abdomen composed of eight transverse segments, deeply and very coarsely punctured at the base, and a ninth forming the depressed apex, coarsely and irregularly punctured, and sometimes ferruginous; the centre depressed, the sides elevated and producing three teeth each, produced at the apex into two furcate lobes, leaving a circular space between them (fig. 11), with a short stout pro-leg beneath at the base (fig. 12, the same in profile); spiracles invisible after death. Legs very small, serrated beneath, with two series of spines at the base, and terminated by a curved claw. Underside more or less ochreous.

Having found the larvæ alive during my sojourn at Pau, in the south of France, I had an opportunity of examining the organs of the mouth in a living specimen, when they exhibited their full development. A description and figures, therefore, of this rare larva may be useful, notwithstanding the illustration of the species

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by my distinguished friend Mr. Léon Dufour,* who entertains an idea that it is carnivorous. I wish also to make collectors acquainted with this larva, and its economy, hoping that it may lead to the capture of more specimens of the perfect insect.

I found these larvæ in the decayed wood of a felled tree, in March, and, like Messrs. Chapuis and Candèze, the evidence I have of their being the larvæ of *Athous rhombeus* is, my having found with them the thorax of that species, with the exuvia; but they certainly agree with the description and figure of *A. hirtus* of those authors,† as well as with De Geer's figure and description of *Elater undatus*.‡ M. Desvignes found in August the larva of *A. rhombeus* in a birch-tree in Sherwood Forest, and the pupa and imago in decayed oak branches.§

Family OPATRIDÆ.

Genus Bolitophagus, Ill., Eledona, Lat. (Pl. V. figs. 13 & 14.)

Sp. 3. *B. reticulatus*, Linn.; *crenatus*, Fab.

Soft, linear, curved in repose; white, with a few scattered hairs. Head orbicular, shining, horny, yellowish (fig. 15); eyes none. Labrum orbicular, bristly (fig. 17). Mandibles meeting, thick, very horny, bifid and pitchy (fig. 18). Maxillæ terminating in a large pilose oval lobe (fig. 19). Palpi stout and triarticulate, 2nd basal joints very thick, 3rd more slender, conical and terminated by a gland (fig. 19 *a*.) Labium subcordate. Palpi minute and biarticulate. Antennæ remote, inserted on each side of the mandibles, triarticulate, stout, especially the basal joint; 2nd oblong; 3rd longer and more slender, terminating in two unequal claws, one with a bristle at the apex (fig. 20). Thorax horny, suborbicular, concave before; the two following thoracic segments similar to those of the abdomen, but they are shorter, with a slate-coloured cloud on the back; abdominal segments fatty, the sides convex; the tail tapering, and furnished at each angle with a conical spine, with transverse striæ and horny at the tip (fig. 21). Stigma distinct. Legs sprawling, stout; coxæ large, very broad at the base; thighs robust, narrowed at the base; tibia slenderer, tapering, furnished with a horny claw (fig. 22, a middle leg).

Mr. Foxcroft found a very large old boletus upon a beech-tree in the Black Forest, Rannoch, Perthshire, which he conveyed to London, where he has been breeding the beetles, I believe, all the

* Annales des Sci. Nat. 2nd Series, vol. xiv. p. 41, pl. 3, B, f. 1—5.
† Catalogue des Larves, p. 144, pl. 5, fig. 1.
‡ De Geer's Mem. vol. iv. p. 155, pl. 5, fig. 23.
§ Entomologist, p. 188.

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winter. I am not aware that the larvæ cut out cocoons in the curious way in which those of the *B. agaricola* form theirs, as observed by Mr. L. Dufour,* for I have not even seen the pupa. The larvæ are very active when taken from their cells, curling and jerking their bodies about when touched. They seem to differ from those of *B. agaricola* in having a styliform tail. I was unable to give a highly magnified figure of the mentum with the lateral palpi, from having lost that portion in dissecting the head.

Family CUCUJIDÆ.

Genus Prostomis, Lat. (Plate V. figs. 23 and 24.

Sp. 5. *P. Mandibularis*, Fab.

Very depressed, elongate, white, shining, with a few scattered hairs. Head transverse, being twice as broad as long; eyes none (fig. 25). Mouth prominent, ferruginous; labrum semi-orbicular, fringed with bristles (fig. 26). Mandibles not large, crossing, outline sinuated, terminating in two sharp teeth, black at their tips, one mandible having a strong tooth towards the base (fig. 27). Maxillæ terminated by an oval lobe, irregularly fringed with bristly spines. Palpi composed of two oval and an elongated elliptical joint (fig. 28*a*). Mentum elongated, produced into a lobe in front, furnished with two parallel bristles. Palpi filiform, biarticulate, basal joint oblong; 2nd smaller, oval, with a bristle at the tip (fig. 29). Antennæ not short, placed on the anterior margin of the head, very remote, and not approaching the mandibles; they are quadriarticulate, the basal joint forming an ample scape, 2nd joint somewhat cup-shaped, 3rd elongate obconic, with a minute conical lobe at the apex, 4th joint placed close behind it, nearly as long as the 3rd, but slender and linear, with a few bristles at the apex (fig. 30). Thorax narrower than the head, with the alimentary canal shining through of an ochreous colour, often becoming black along the back; the prothorax and mesothorax are transverse oval, being united by a neck, which forms a projecting angle or acute tooth on each side; metathorax transverse, but narrowed only at the base. Abdomen formed of nine distinct segments, seven much broader than long, with two faint long spots on each, forming two lines down the back, 8th joint narrower, tapering, apical joint suborbicular, with two conical protuberances at the extremity, forming a concavity between them; the margins appearing tubercled when greatly magnified (fig. 31). Legs short and stout; coxæ sub-globose; thighs very clavate, tibiæ sub-ovate, with short spiny bristles; claws strong but very acute (fig. 32).

* Ann. des Sci. Nat. 2nd Series, vol. xx. p. 284, pl. 12, B.

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This curious insect not having been yet discovered in Britain, I have added a figure of the beetle (fig. 33 *a*, the natural size); and as there are many peculiarities in its structure, and it departs considerably from the type of the *Cucujidæ*, I have determined to add dissections of the mouth, which will be serviceable also in exhibiting the differences between the same insect in the larvæ and imago states. In fig. 34, which shows the underside of the head of the beetle, the two long processes, like bulls' horns, are very remarkable (fig. 34 *a*), and their use inconceivable, unless they are employed to divide the laminæ in the decayed trees, between which the *Prostomis* delights to nestle, in invisible spaces, which from its depressed form it is enabled to do, and the larvæ are still thinner, being apparently composed of nothing but their transparent horny covering, with an alimentary canal shining through. The labrum (fig. 35) is semi-orbicular, and attached to an elongated or lobe-shaped clypeus. The mandibles, which project, are unequal, one being very much dilated on the outside (fig. 36), and they have both a series of teeth on the inside, with larger ones at the apex. The maxillæ comprise two remarkably long lobes, the outer one articulated, at the base of which arises a still longer palpus of four joints (fig. 38). The labrum is singularly shaped, forming a flattened pointed tongue: the palpi are not attached to the base, and they are long and triarticulate (fig. 39). In the genus *Cucujus*, at least in the minute species I dissected in the British Entomology,* the jaws, although porrected, are not particularly developed, and they are notched internally, more like the *Heteromera:* the oral organs are not elongated, and all the palpi have fewer joints, viz. 3 and 2. It is evident that the great development in *Prostomis* is necessary to obviate the obstruction occasioned by the cephalic horns, and it is very singular that in the larva there is no indication of those processes. The beetle is furnished with ample wings, and the legs, like those of *Cucujus*, are very short; the hinder pair very remote, and it is perfectly tetramerous (fig. 40), whilst *Cucujus ferrugineus* or *C. testaceus* are pentamerous.

As *Prostomis* inhabits oaks and chesnuts, and is widely distributed in France and Germany, I hope it may some day find its way legitimately into our English fauna. The beetles with this larvæ were abundant near Pau in March, in the trunks of decaying and very aged chesnut trees. They preferred portions several feet from the ground, and were secreted between the lamina of the wood, where it was quite wet, rotten and soapy, resembling

* Curt. Brit. Ent. pl. and fol. 510.

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chocolate-coloured mud. We never found them under the bark, which was an asylum, however, for another interesting beetle, the *Dryophthorus Lymexylon*, and amongst the dead leaves at the base of the tree was secreted the beautiful *Carabus splendens*. The capture of these insects adds to my pleasing recollections of a winter at Pau, where I could enjoy my favourite pursuits, even in the depth of winter and early spring, owing to the mildness of the climate and the splendid sun; and my rambles were rendered agreeable and profitable by the society of scientific friends, especially of Mr. Charles Delaronzée, a most zealous Entomologist and intelligent young man, to whom I am indebted for a knowledge of the *Prostomis* and its economy. He has since been elected into the Entomological Society of Paris, to become a valuable member of that excellent institution, and, I doubt not, he will be an honour to his country.

I will close this notice by stating, that when I had the pleasure of visiting M. Léon Dufour, at St. Sever, in the spring of last year, amongst many other interesting objects, he showed me some aquatic larvæ which had been alive two years, specimens of which I now exhibit. He had never succeeded in rearing them, nor had he any idea of their origin, beyond taking them from a brook upon some stones. Having attentively studied them, I am inclined to believe they are the larvæ of *Helophorus granularis*, Linn. I hope my estimable friend will eventually succeed in obtaining the beetles, and will add their history to the numerous and valuable discoveries he has made in insect economy.

EXPLANATION OF PLATE V.

Fig. 1. Larva of *Velleius dilatatus*, Fab.; * natural length.
Fig. 2. Underside of head; 2*a*, the antennæ.
Fig. 3. The clypeus.
Fig. 4. A mandible.
Fig. 5. Maxillary palpus.
Fig. 6. Mentum, labium and palpi.
Fig. 7. Apex of abdomen; 7*a*, the proleg; 7*b*, the styles.
Fig. 8. A leg; 8*a*, the coxæ; 8*b*, trochanter; 8*c*, femur; 8*d*, tibiæ; 8*e*, the claw.
Fig. 9. Larva of *Athous rhombeus*, Oliv.
Fig. 10. Upper side of head; 10*a*, mandibles; 10*c*, apex of maxillæ and palpi; 10*d*, labium and palpi; 10*e*, antennæ.
Fig. 11. Apical segment of abdomen; upper side.
Fig. 12. The same, in profile; 12*a*, the proleg.

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Fig. 13. Larva of *Bolitophagus reticulatus*, Linn.
Fig. 14. The same magnified.
Fig. 15. Upper side of head.
Fig. 16. Under side of head.
Fig. 17. The labrum.
Fig. 18. A mandible.
Fig. 19. Maxilla; 19 *a*, the palpus.
Fig. 20. The antenna.
Fig. 21. Apical segment of abdomen.
Fig. 22. A middle leg.
Fig. 23. Larva of *Prostomis mandibularis*, Fab.
Fig. 24. The same magnified.
Fig. 25. Upper side of head.
Fig. 26. Labrum.
Fig. 27. Mandible.
Fig. 28. Maxilla; 28 *a*, the palpus.
Fig. 29, Mentum and palpi.
Fig. 30. Antenna.
Fig. 31. Apex of abdomen.
Fig. 32. Leg.
Fig. 33. *Prostomis mandibularis;* • the natural length.
Fig. 34. Head, viewed beneath; 34 *a*, the cephalic horns.
Fig. 35. Labrum; 35 *a*, the clypeus.
Figs. 36 and 37. A pair of mandibles.
Fig. 38. Maxilla; 38 *a*, internal lobe; 38 *b*, external lobe; 38 *c*, palpus.
Fig. 39. Mentum; 39 *a*, labium; 39 *b*, palpi.
Fig. 40. A hind leg.

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VI. *Observations on the Economy of* Pompilus punctum *and other* Hymenoptera. *By* F. Smith, Esq.

[Read 1st August, 1853.]

Some time ago, Mr. W. Thompson, Director of the Natural History Department at the Crystal Palace, submitted to my examination a number of mud or clay cells, evidently the production of some insect; at that time I expressed an opinion that they were constructed by some Diplopterous insect, probably an *Odynerus*; these cells were found at the beginning of November, on the top of a straw bee-hive, worked into the layers, the bee-hive having been covered with an old cloth and a milk pan; others were found in the back part of an old mirror. These discoveries were made by the Rev. W. Delmar, in his garden at Elmstone Rectory, near Canterbury.

At the expiration of some weeks I observed in the glass-topped box, in which I had placed the cells, a black species of *Pompilus*, running about with great activity. The insect proved to be a male, and I at once recognized the species to be the *P. punctum* of Fabricius. I was much pleased at this, as I felt a certainty of having an opportunity of settling beyond a doubt what was the female of that species. On the following day, the 15th of June, two more males came forth; no further development took place until the expiration of ten days, when, to my astonishment, or rather satisfaction, for I had long suspected some mistake respecting the species, two females appeared, and proved to be the *P. petiolatus* of Van der Linden.

Shuckard, in his Essay on the Fossorial *Hymenoptera*, states, that he is unacquainted with the female of *P. punctum*, which Van der Linden considered to be the *P. petiolatus*, and Shuckard describes a different male as that of the species. Mr. Desvignes, who now possesses the Shuckardian collection, placed in my hands the types, but there was no male amongst the specimens of *P. petiolatus*, and we are left in ignorance of the male described in the Essay; but in all probability it was only a variety of the "*punctum*," which would in some instances answer the description of Shuckard, the white markings on the face being, I have observed, frequently more or less obliterated. Be this as it may, the *P. petiolatus* of Van der Linden is certainly the female of *P. punctum*.

In the first volume of the "Transactions" of this Society will be found a most able and interesting Paper on the habits of the fossorial *Hymenoptera*, by Mr. Shuckard, who there most suc-

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cessfully confutes the theory of St. Fargeau, who observing that, amongst this tribe, many species were destitute of cilia on their anterior tibiæ, and also of spines externally down the posterior pair, suggested the probability of such species being parasitic; the *P. punctum* is one of the species thus circumstanced, and here we have a clue to the complete explanation of the apparent anomaly—an insect which constructs mud cells has no need of the cilia or spines, so useful to an insect which forms its burrows in sand; the cilia on the anterior tibiæ forming as it were a brush, with which to sweep out the particles of sand, from time to time, in forming its burrow, and the spines, placed exteriorly on the posterior tibiæ, which in burrowing are placed against the sides of the tunnel, which gives the creature a purchase whilst scratching, or disengaging the sand with its mandibles.

The structure of the *Pompilus* in question naturally calls to the mind of an Hymenopterist another insect, which long suffered under the imputation of being a parasite—I allude to *Pelopæus*. My friend, the late Edward Doubleday, had, it is true, ever since his return from America, asserted the contrary, but it remained for Mr. Gosse, in the second volume of the "Zoologist," to publish one of the most amusing and graphic sketches of insect architecture which I ever had the good fortune to fall in with; this set the matter, as regards the *Pelopæi*, at rest; and if any be wanting, I thing the discovery of the *P. punctum* being a constructor of mud cells, similar to those of *Pelopæus*, furnishes decisive testimony against the theory of St. Fargeau.

My own experience does not furnish a single instance of parasitism in the whole tribe of fossorial *Hymenoptera*;* and, if I am not trying your patience too far, I will take this opportunity of adding the results of my own observations in further elucidation of this interesting subject. I will, in the first instance, make a few observations upon the various insects mentioned in Mr. Shuckard's paper above alluded to.

The first insect I would observe upon is the *Sapyga quadriguttata*, which I have captured conveying its prey, a small Lepidopterous larva, and have also found its cells, formed in a sand-bank, filled with similar larvæ; when the larva of *Sapyga* is full fed, it spins a tough brown cocoon, very similar to that of an *Osmia*. The genus *Tryposylon*, were St. Fargeau's theory correct, would be parasitic, but I have repeatedly observed the different species conveying their prey, and have also repeatedly bred the insects.

* I here speak of British insects; the *Scoliadæ* are known to be parasitic—and I suspect that *Tiphia* is the parasite of *Aphodius*. The *Mutillidæ* are also said to be parasitic.

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Their choice of situation is varied; a decayed post, a bramble stick, or a bank of light earth; in the latter situation I once discovered a complete colony. The prey of all the British species of this genus is spiders.*

Pemphredon, and all the species of *Diodontus*, provision their own nests, as well as the insects forming the genus *Passalæcus;* most of these species prey upon *Aphides*. I shall pass over the various species of bees, remarked upon by Shuckard, as I intend to enter upon the subject at some length in a Monograph on the British *Apidæ*. I would, in conclusion, however, make a few remarks upon the solitary wasps, which have their tarsi and tibiæ destitute of spines and cilia. *Odynerus parietum* is an insect very variable in its habits.† I have repeatedly obtained its nests, having found its cells formed in an excavated bramble-stick, which was lined with a thin layer of mud or agglutinated sand; at another time it chooses a decayed rail or board; then again a hole in the mortar of a wall; and on one occasion, in an old lumber room of an outhouse, I found several cells placed longitudinally in a lady's fan, which lay half open upon a shelf. These variations in situation induce me to believe that it seldom, if ever, forms its own burrow; but, like most of the insects of the tribe destitute of the usual fossorial appendages, it constructs its cells in any suitable situation prepared and adapted to its purpose. I have frequently observed insects similarly constructed to the *P. punctum*, &c. in the act of closing their burrows, but I never detected one in the act of excavating. Mr. Shuckard, in the notes appended to his paper on these insects, mentions the fact of these insects closing the entrance to their burrows, and follows this up by an observation, that their eggs are speedily hatched, and that they change into a pupa before the winter, in which state they lie dormant until the following spring. This is an incorrect supposition; observation has led me to believe that no Hymenopterous insect passes the winter months in the pupa state; a change from that to the perfect state either takes place, or they remain as larvæ until the return of spring. I tried the experiment of freezing the larva of *Anthophora Haworthana*, and, on the return of spring, the larvæ which had been frozen so hard that I could snap them in two, were amongst the first to change to the pupa state, and so on to perfect insects.

* Vide Kennedy in Lon. and Edinb. Phil. Mag. Jan. 1837, p. 16.
† Ibid. p. 18.

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VII. *Description of a new British Species of* Ichneumon. *By* Thomas Desvignes, Esq.

[Read November 7th, 1853.]

Ichneumon paludator.

♂ Abdomine nigro; ♀ apice albo; femoribus tibiisque rufis. ♂ & ♀.

♂ Orbitis oculorum infra antennas distinctius aut obsoletius, et apice scutelli albis.

♀ Lineola infra scutellum, annulo antennarum albis. Scutellum album.

Longitudo 7—7½ lin.

Caput maris orbitis oculorum infra antennas albis aut albidis. Palpis ♂ et ♀ nigris, apice ferrugineis. Clypeum hirtis ferrugineis. Antennæ ♂ corporis dimidii longitudinis, porrectæ, nigræ, subtus fusco-ferrugineæ, ♀ involutæ; 1—6 apice articulorum dilute ferrugineis, 7—12 albis (basi 7o), et sequentibus nigris. Metathorax areola supero media, *equi solea formæ*. Scutellum fœminæ totum, in mare apice solo interdum tenuissime, album. Alæ fumato-hyalinæ, radio et squamula ferrugineis; stigmate flavo-ferruginea; areola subquinque angulari. Pedes, præsertim fœminæ, crassiusculi, rufi; coxis et trochanteribus, necnon tarsis et tibiis posticis maris, nigris, his summo basi rufo-ferrugineis; tarsis mediis fuscis, basi fulvis; fœminæ tibiis posticis apice summo et articulo 5o tarsorum mediorum superne fuscis, hujus basi rufa. Abdomen maris elongatum, thorace paullo angustius, nigrum; segmento 1o apice in medio aciculato, 2o foveæ profundæ spatio interjacente fere usque ad medium segmenti aciculato; fœminæ latior quam mare, segmento 6 margine 7 fere toto albis, lateralibus satis nigris, apice acuto; aculeus brevis, exsertus.

This species, which is closely allied to *Ichn. saturatorius* of Gravenhorst, inhabits the larva or pupa of *Nonagria Typhæ*, and for many specimens I am indebted to Mr. Samuel Stevens, who bred them from *Nonagria paludicola*, and also to Mr. Edwin Shepherd. These larvæ were taken in Hammersmith marshes.

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VIII. *Characters of undescribed* Lucanidæ, *collected in China, by R. Fortune, Esq. By* W. Wilson Saunders, Esq., F.R.S., &c.

[Read 3rd April, 1854.]

The *Lucanidæ* formed a very marked portion of the *Coleoptera* collected in China by Mr. Fortune during his last interesting travels through the tea districts of that country. Looking to the number of species he procured, it would appear that the tea districts of China are very rich in this remarkable family, and bear in this respect a strong resemblance to the high lands of India, and especially Assam, from whence Entomologists have derived so many fine species, and which seems to be quite the head quarters of the family *Lucanidæ*. Some of the species collected by Mr. Fortune are identical with species already described from India, while others appear to be altogether new to Entomology; and it is the object of the present paper to place before the Entomological Society the characters of these latter, with figures, from the pencil of Mr. Westwood. From Mr. Fortune's exertions during his present travels in China it is to be hoped that the list of new species of *Lucanidæ* will be considerably augmented, although the first lot of insects which have been received from him does not contain any novelties in this family. It has, however, been instructive in furnishing long series of specimens illustrating species which had before been found only very sparingly. In determining the species I have received great assistance from my friend F. S. Parry, Esq., and for which I have great pleasure in tendering him my best thanks.

Species described.

Lucanus, Lin.

1. *L. Fortunei* ♂ and ♀, Parry, MSS.

Cladognathus, Burm.

2. *C. gracilis* ♂, W. W. Saunders.

Odontolabris, Hope.

3. *O. nitidus* ♂, W. W. Saunders.
4. *O. sinicus* ♂ and ♀, Reiche, MSS.
5. *O. emarginatus* ♂ and ♀, Reiche, MSS.

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PLATYPROSAPUS, Hope.

6. *P. platymelus* ♂, W. W. Saunders.
7. *P. Hopei* ♂. W. W. Saunders.

DORCUS, MacLeay.

8. *D. striato-punctatus* ♂, W. W. Saunders.
9. *D. vicinus* , W. W. Saunders.
10. *D. obscurus* ♀, W. W. Saunders.
11.? *D. lateralis* ♀, W. W. Saunders.
12.? *D. striatus* ♀, W. W. Saunders.

ÆGUS, MacLeay.

13. *Æ. lævicolle* ♂, W. W. Saunders.
14. *Æ. punctiger* ♂, W. W. Saunders.

All the species described in this paper are in the Collection at the British Museum, and most of them will also be found in the Collection of F. S. Parry, Esq., as well as in my own Collection.

Sp. 1. *Lucanus Fortunei*, Parry, MSS. (Pl. III. figs. 1 and 2.)

Dark chesnut. ♂ with the head much enlarged, transverse, subquadrangular, flattened above, broader than the thorax, having the anterior margin nearly straight, the lateral and posterior margins emarginate, the anterior angles produced into a truncated point, and the posterior angles much rounded; the upper surface minutely granulated. Mandibles long, and curved inwards; armed on the inner edge with a number of minute teeth, and two larger teeth, one near the apex, pointing downwards, and the other a little beyond, having a horizontal direction. Antennæ long and slender, abruptly clavate; clava 4-jointed. Thorax transverse, subquadrate, darker chesnut than the rest of the body, rugose punctate. Scutellum small, broad at the base, rounded at the apex. Elytra broader than the thorax, subovate, finely punctured, with the suture shining; underside of the body subpubescent, finely punctured. Legs long and slender. The posterior and middle femora longitudinally margined in front with red brown; the anterior tibiæ with four to five teeth externally; the middle and posterior tibiæ with two slight teeth similarly situated.

Length 2 inches, head $\frac{6}{10}$ inch broad. Mandibles $\frac{6}{10}$ inch long.

♀ of the same colour as the ♂, with the head small, transverse, subquadrate, rugose punctate above. Mandibles short, curved, stout, with a broad projecting tooth internally, near the apex. Thorax transverse, with the lateral margins rounded, anterior

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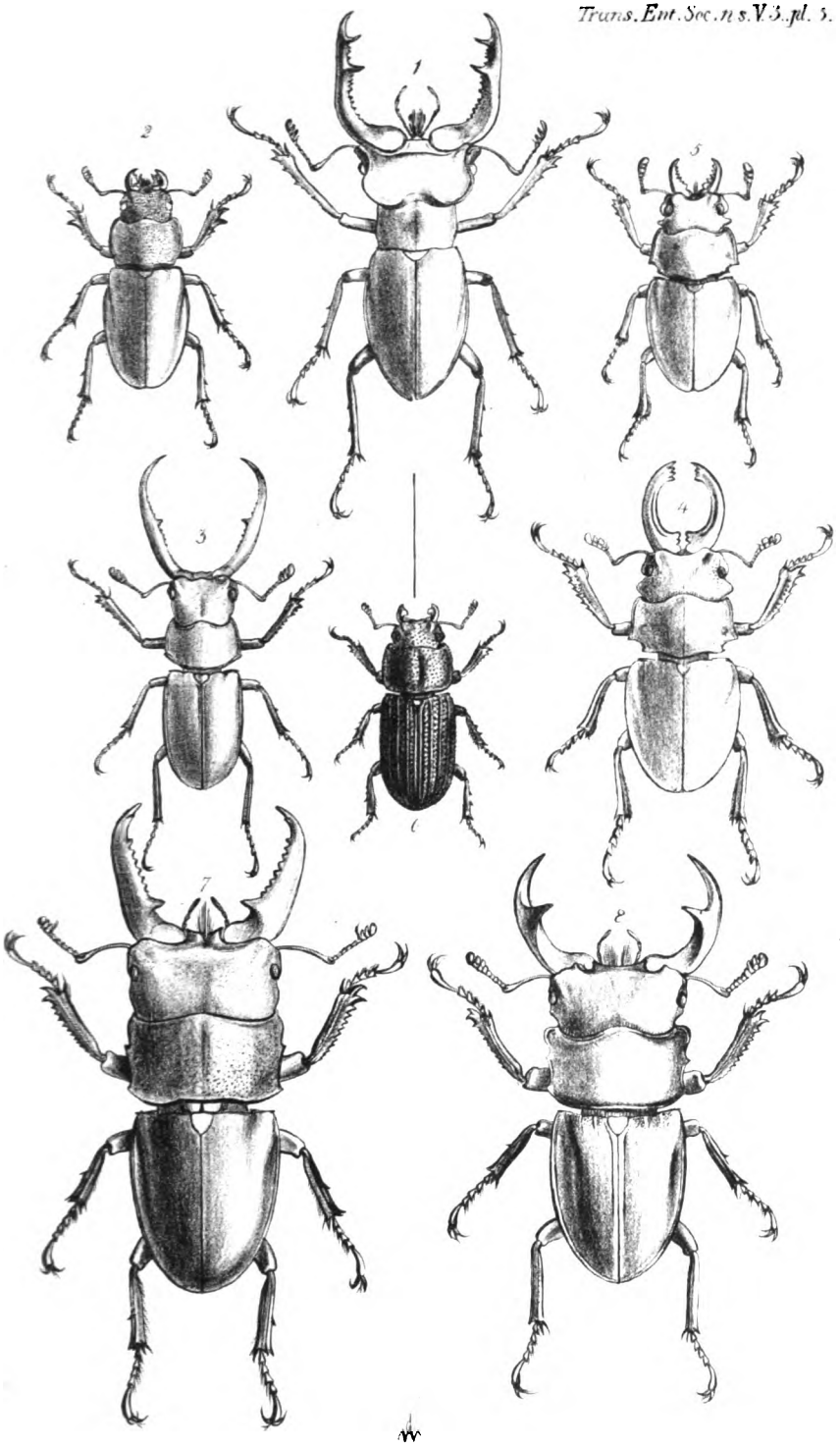

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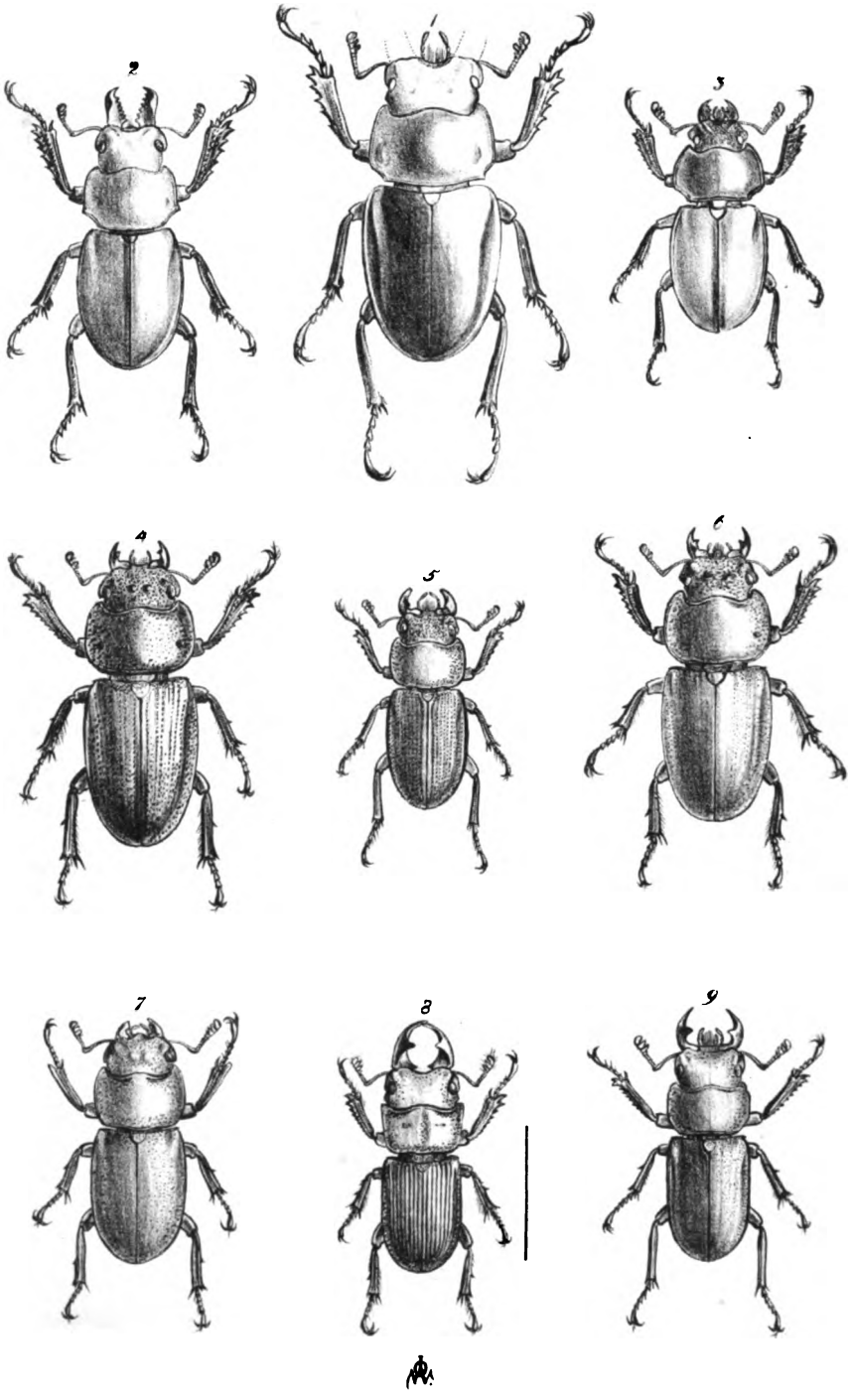

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and posterior margins nearly straight, and having the posterior angles emarginate. Legs shorter and stouter than in the ♂. In other respects as the ♂.

Length $1\frac{1}{10}$ inch.

This appears a very distinct species; and in the full-grown insect not subject to much variation. It has been received from Mr. Fortune in some abundance, and is probably a common insect in the hill districts.

Sp. 2. *Cladognathus gracilis*, W. W. Saunders. (Pl. III. fig. 3.)

Dark pitchy brown, with the elytra dark chesnut brown. ♂ with the head subquadrate, not quite so broad as the thorax, rather narrower posteriorly, with the anterior margin somewhat emarginate; upper surface shallowly excavated between the eyes, and finely granulated. Mandibles long, deflexed and slender, curved inwardly towards the apex, and having on the interior margin six to eight minute teeth, and one larger in the midst, placed near the centre. Antennæ rather long, slender; clava 4-jointed, ovate, elongate. Thorax transverse, the lateral margins rounded, and the hinder margin, with the angles, slightly truncate; above convex, finely granulated. Scutellum small, semi-ovate, pointed at the apex. Elytra about as broad as the thorax, rounded at the apex, with the sides nearly parallel, smooth, very finely granulated. Under surface of the body dark pitchy brown. Legs rather long and slender. The anterior pair, with the tibiæ, striato-punctate, and having on the outer margin a number of small teeth, irregular in size and position, but the four nearer the apex largest, and the two anterior ones spreading and curved downwards. The intermediate and posterior tibiæ unarmed externally.

Length $1\frac{7}{10}$; mandibles $\frac{6}{10}$ inch.

This is a well marked species; with the head in the male very large, and the legs very long and thin. Some specimens I have recently seen from Mr. Fortune are somewhat larger, and have the head broader in proportion than the one described.

Sp. 3. *Odontolabris nitidus*, W. W. Saunders. (Plate IV. fig. 1.)

Shining black. ♂ Head transverse, subquadrate, with the anterior angles prominent, caused by a sharp flattened ridge crossing the eyes horizontally, and the anterior margin slightly emarginate: upper portion rounded, flattened between the eyes, with the surface opaque, and very finely granulated. (Mandibles wanting in all the specimens sent home.) Thorax broader than the head, sub-

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quadrate, transverse, rather broader posteriorly, the lateral margins smooth and somewhat rounded; the posterior margin straight and the posterior angles bevelled off; the upper surface convex, very finely granulated, shining. Scutellum minute, triangular. Elytra about as broad as the thorax, ovate truncate, with the lateral margins slightly reflexed, and the upper surface convex and very shining. Legs robust, having the anterior tibiæ broad and flattened, with six well-defined teeth on the outer margin, and the upper and under surfaces striato-punctate. The middle and posterior tibiæ sub-cylindrical, striato-punctate, with only one apical tooth. Tarsi rather long and slender. Underside of body shining black.

Length, without mandibles, $1\frac{5}{10}$ inch.

The elytra of this species are remarkably smooth and shining, a character which at once catches the eye. Every specimen sent home had the mandibles wanting, apparently pulled out from their sockets. Mr. Fortune could give me no account of the cause of this deficiency. The *O. glabratus* of De Hahn is very closely allied to this species.

Sp. 4. *Odontolabris sinicus*, Reiche, MSS. (Pl. IV. figs. 2 & 3.)

Dark chesnut. ♂ with the head transverse quadrate, and the anterior angles prominent, caused by a thin horizontal ridge crossing the eyes, and having the anterior margin slightly emarginate, with the upper surface flattened, finely granulated and opaque; dark rusty brown. Mandibles short, stout, straight, about as long as the thorax, slightly curving upwards, with three blunt teeth on the inner margin, and a blunt broad tooth on the upper edge, near the apex, black brown. Thorax much broader than the head, transverse, rather broader posteriorly, with the lateral margins rounded and smooth, the anterior margin emarginate, and the posterior nearly straight, curving forwards near the angles, dark rusty brown, rounded above, the surface finely granulate and opaque. Scutellum small, semi-ovate. Elytra ovate truncate, the surface smooth, opaque; the suture shining, and the lateral margins slightly reflexed, regularly convex; dark chesnut brown. Legs pitchy brown, rather long, with the fore tibiæ flattened, and having six strong teeth on the outer margin, the upper surface coarsely striato-punctate: the middle and posterior tibiæ sub-cylindrical, with one apical tooth, and the surface striato-punctate. Tarsi stout. Underside of body dark chesnut brown, somewhat shining.

Length $1\frac{5}{10}$ inch.

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The ♀ differs little from the ♂ except in the smaller size, and less quadrate shape of the head, and in the shorter mandibles, which have but little inclination upwards, and furnished internally but with two teeth.

A very nearly allied species to this (*O. castanopterus*) occurs in India, but differs in having the mandibles not so long, and nearly horizontal, as well as in the shining surface of the elytra, and in the colour of the same being bright chesnut.

Length $1\frac{1}{10}$ inch.

Sp. 5. *Odontolabris emarginatus*, Reiche, MSS. (Pl. III. figs. 4 & 5.)

Black. ♂ with the head transverse, subquadrate, emarginate in front, with a strong blunt tooth on each side behind the eyes, convex above, opaque, finely granulated. Eyes crossed horizontally, with a narrow sharp ridge projecting from the forepart of the head. Mandibles, when fully developed, nearly as long as the head and thorax, strongly bowed inwards, forming when closed the shape of a circle or blunt oval, nearly of equal size throughout their length, with one stout blunt tooth at the base; the apex truncate, and having four minute teeth in the truncated portion. Antennæ rather long and expanded. Thorax somewhat broader than the head, subquadrate, transverse, rather broader posteriorly, the lateral margins smooth, the anterior margin curving forwards in the centre, and the hinder margin curved in the opposite direction, and having a shallow notch just before the hinder angles; convex above, very finely granulated, opaque. Scutellum minute, subtriangular. Elytra of the same breadth as the thorax, semi-ovate, with the lateral margins slightly reflexed, and with the upper surface convex, very finely punctato-granulate and opaque. Legs rather long, with the fore tibiæ flattened and expanded at the apex, armed externally with a row of about seven small equidistant teeth on the outer margin; middle and posterior tibiæ subcylindrical, with a longitudinal broad furrow on the upper side, and only armed with a single tooth at the apex. Underside of body rather shining; abdomen pitchy brown.

♀ scarcely differing from the ♂, except in being smaller, and in the shape of the mandibles, which are short, stout, about as long as the head, nearly straight, slightly incurved at the apex, and armed internally with a row of seven or eight small irregular blunt teeth.

Length, ♂, large specimen, $1\frac{7}{10}$ inches (mandibles $\frac{4}{10}$); small specimen, $1\frac{3}{10}$. ♀ $1\frac{1}{10}$.

A neat and well-marked species. The ♂ varies much in the

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length of the mandibles, which, at times, are almost as short as those of the ♀. They have, however, always the same conformation at the apex, which is a good distinguishing character.

Sp. 6. *Platyprosapus platymelus*, W. W. S. (Pl. III. fig. 7.)

Pitchy black, with the tibiæ pitchy brown. ♂ Head very broad, transverse, quadrangular, the anterior margin slightly emarginate; upper surface rather coarsely granulated, nearly flat. Mandibles horizontally porrect, robust, nearly straight, curved inwards towards the apex, gradually tapering, armed internally with one large tooth near the base, and a number of (8 or 9 nearly equal) smaller ones, placed at regular intervals, on the straight portion, and one small one on the curved portion. Antennæ rather robust, with the clava small, 4-jointed; first joint small, armed internally with a curved spine-like projection. Labium large, transverse, rounded in front, uniform brown. Eyes small, nearly divided into two portions, with an elevated projecting, horizontal ridge of the head, dark shining chesnut. Thorax transverse, rather broader than the head, nearly quadrangular, with an obtuse tooth about the middle of the lateral margins, nearly flat above, finely granulated. Scutellum small, semiovate, pointed at the apex. Elytra nearly as broad as thorax, semiovate, with the shoulders prominent, smooth and shining. Legs moderate in length, robust. Anterior tibiæ striate and finely punctate, armed externally with a row of 10 to 12 small teeth. Intermediate and posterior tibiæ with one pointed tooth on the outer margin, and three short robust teeth at the apex. Underside of body finely punctured, shining.

Length 2½ inches. Mandibles $\frac{1}{10}$ inch.

A species nearly allied to the *Plat-Westermanni*, Hope, but differs in the head being more quadrate and less transverse, and also in the mandibles, which are nearly truncated, and not curving downwards as in that species.

Sp. 7. *Platyprosapus Hopei*, W. W. S. (Plate III. fig. 8.)

Pitchy black. ♂ with the head very broad, transverse, subquadrangular, slightly restricted near the thorax, the anterior margin somewhat emarginate, and the anterior angles excavated for the insertion of the mandibles, and each with a blunt point on the upper part. Upper surface flattened, finely granulated. Mandibles strong, incurved, horizontally porrect, with one strong tooth about the middle, inclining upwards, longer than the thorax.

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Thorax transverse, subquadrate, rather broader than the head, the anterior angles prominent, the posterior somewhat rounded, and having a broad shallow tooth on the lateral margins, near the middle; upper surface very finely granulated, slightly and regularly convex. Scutellum rather small, cordato-triangular. Elytra semiovate, rather narrower than the thorax, the shoulders prominent, nearly straight at the base, the margins slightly reflexed, the surface regularly but slightly convex, somewhat shining, nearly smooth. Legs moderate—the anterior tibiæ with 10 to 12 small, blunt, irregular teeth on the outer edge, the middle pair with one small tooth in the middle of the outer edge—the posterior pair edentate. Tarsi stout.

Length $1\frac{3}{10}$ inch. Mandibles $\frac{6}{10}$ inch.

A nearly allied species to the foregoing, but differing in the shape of the head and mandibles in the ♂.

Sp. 8. *Dorcus striato-punctatus*, W. W. S. (Plate IV. fig. 5.)

Black, somewhat shining. ♂ Head subquadrate, transverse, the sides curving slightly outwards, caused by an horizontal ridge crossing the eyes; somewhat emarginate in front, with a broad, slightly projecting protuberance in the emargination, having a notch in the centre; upper surface deeply and coarsely punctate, the vertex with an obscure shallow depression. Mandibles shorter than the head, incurved, rather slender, with one blunt tooth projecting upwards on the upper side, near the base. Antennæ rather long and stout. Thorax rather broader than the head, subquadrate, transverse, the fore angles produced, the sides slightly curving outwards, and the posterior angles rounded—regularly convex, smooth on the disk, punctate towards the sides. Scutellum small, semiovate, pointed, deeply punctate. Elytra of the same width as the thorax, semiovate, elongate, with 13 nearly equi-distant, deeply punctate, longitudinal striæ, the striæ somewhat closer as they approach the side, and the punctures there nearly confluent. Legs moderate; fore tibiæ somewhat flattened, striato-punctate, with 7 or 8 short blunt teeth on the outer margin; middle and posterior tibiæ sub-cylindrical, each with one small apical tooth, and the former with one small tooth placed centrally on the outer margin. Femora, on the underside, pitchy brown. Tarsi moderate. Underside of body deeply punctate.

Length $1\frac{1}{10}$ inch.

Sp. 9. *Dorcus vicinus*, W. W. S. (Plate IV. fig. 9.)

Black, shining. ♂ Head subquadrate, transverse, the fore

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angles rounded; anteriorly emarginate, with a broad straight elevation in the emargination, extending from the base of one mandible to the other—the sides slightly curving outwards, and the eyes half-crossed horizontally by a thin sharply-edged plate; flattened above, opaque, and very finely granulated. Mandibles rather longer than the head, incurved, rather slender, sharp pointed, and having one broad tooth projecting inwards from the upper margin near the base. Thorax subquadrate, transverse, broader than the head; the posterior angles rounded, and slightly so the anterior; regularly convex above, shining, very finely granulated. Scutellum transverse, minute, semiovate, pointed. Elytra not quite so broad as the thorax, semiovate, elongate, shoulders prominent; very shining, nearly smooth, minutely punctured. Legs moderate, the anterior tibiæ somewhat flattened, and broader at the apex; punctato-striate above, having at the apex two teeth, and along the outer edge a row of 8 to 10 teeth like serratures; middle tibiæ subcylindrical, with one small, central, pointed tooth on the margin; posterior tibiæ subcylindrical, without teeth. Tarsi moderate. Underside of body shining.

Length $1\frac{3}{10}$ inch.

The *D. cognatus* of Hope bears a close relationship to this species, but differs in the larger size and shape of the mandibles.

Sp. 10. *Dorcus obscurus*, W. W. S. (Plate IV. fig. 7.)

Black, opaque. ♀ Head subsemicircular; slightly emarginate in front, with a shallow protuberance in the centre of the emargination, the eyes crossed horizontally with a sharp flat ridge, which there causes a prominence; convex above, rugoso-punctate, with two broad, obscure, slight elevations on the centre of the vertex, which are smooth. Mandibles short, blunt, nearly straight, with a broad blunt tooth on the inner edge, and a slight rounded elevation on the upper side, near the base. Antennæ moderate. Thorax broader than the head, subquadrate, transverse; the anterior angles prominent, the sides slightly curving outwards; the posterior margin straight, with the angles rounded; convex above, nearly smooth, except near the sides, which are punctate. Scutellum small, semiovate. Elytra of the same breadth as thorax, and about twice as long, rounded at the apex, the sides nearly parallel, the shoulders rather prominent, and the sides slightly reflexed; regularly convex above, the surface punctate and obscurely striate, each elytron with 9 longitudinal striæ running in equidistant and close pairs, except the stria near the suture. Legs moderate; the anterior tibiæ somewhat flattened, without

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teeth, striato-punctate above; the middle and posterior tibiæ subcylindrical, punctato-striate, with a sharp tooth externally. Tarsi moderate.

Length $1\frac{2}{10}$ inch.

This female is probably a true *Dorcus*.

Sp. 11. *Dorcus? marginalis*,* W. W. S. (Pl. IV. fig. 6.)

Black, with the margins of the elytra obscure pitchy brown. ♀ Head subquadrate, transverse, slightly contracted behind the eyes, with a slight rounded projection in the centre of the front, the eyes crossed horizontally by a sharp flat ridge; the upper surface convex, deeply rugoso-punctate. Mandibles short, rather slender, horizontally porrect, slightly incurved, with one strong tooth on the centre of the inner edge, and a blunt tooth on the upper surface, near the base. Antennæ rather short, robust. Thorax broader than the head, subquadrate, transverse, the lateral margins slightly curved outwards; the posterior margin straight, with the angles rounded; upper surface convex, shining, smooth on the disk, deeply punctate on the sides. Scutellum small, subtriangular. Elytra about as broad as thorax, semiovate, elongate, the shoulders prominent; regularly convex, shining, smooth on the portion adjoining the suture, but deeply and coarsely punctate along the sides. Underside of the body shining. Legs short, robust, with the fore tibiæ flattened, striato-punctate above, and having a row of about 10 smaller regular blunt teeth on the outer edge; middle and posterior tibiæ subcylindrical, striato-punctate, each with an apical tooth, and another sharply-pointed tooth on the outer edge, a little below the middle. Tarsi short, stout.

Length $1\frac{1}{2}$ inch.

A ♀ provisionally placed in the genus *Dorcus*.

This ♀, except in the much larger size and the nature of the teeth on the fore tibiæ, comes very close to the ♀ of *Dorcus lateralis*, of Dej. Cat., from the island of Java.

Sp. 12. *Dorcus? striatus*, W. W. S. (Plate IV. fig. 4.)

Black, shining. ♀ Head sub-semicircular, the eyes crossed horizontally, with a sharp ridge, which there causes a prominence, slightly emarginate in front, with a slight protuberance in the emargination; convex above, deeply and coarsely rugoso-punctate, with a depression just above each eye, and in the centre of the

* In the list of species at the commencement of this paper the name of *lateralis* must be altered to *marginalis*.

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vertex two pointed elevations placed near each other. Mandibles shorter than the head, thin, slightly incurved, with one tooth on the inner edge, and a slight elevation on the upper portion, near the base. Antennæ moderate. Thorax broader than the head, transverse, subquadrate, the sides slightly curved outwards, the posterior margin nearly straight, with the angles slightly rounded; upper surface regularly convex, punctate, the punctures being widely spread on the disk, close together near the sides. Scutellum small, ovato-triangular. Elytra as broad as thorax, semi-ovate, elongate, the shoulders rather prominent, the lateral margin slightly reflexed; regularly convex, each elytron with 9 longitudinal punctate striæ placed somewhat equi-distant, in pairs, except the one near the suture, the spaces between the striæ being more or less punctate, the punctures much prevailing near the sides. Legs moderate; the anterior tibiæ flattened, punctato-striate above, and with a row of about 12 small teeth on the outer edge; the middle and posterior tibiæ subcylindrical, striato-punctate, each with a small central tooth externally, and one at the apex. Tarsi stout.

Length 1½ inch.

Another ♀, which I place provisionally in the genus *Dorcus*, although I do not feel at all sure that this is its proper place—time will show.

Sp. 13. *Ægus lævicolle*, W. W. S. (Plate IV. fig 8.)

Black and shining. ♂ with the head broad, quadrate, slightly emarginate in front, the sides with a slight notch, just in advance of the horizontal plate crossing the eye, and another where the plate terminates; flattened above, and somewhat sunk between the eyes, opaque, finely granulated. Mandibles incurved, sharp pointed, longer than the thorax, broad at the base, where there is a small tooth, and another on the upper margin, broad, triangular, incurved, placed a little below the centre. Thorax a little broader than the head, quadrate, transverse; the anterior angles acute; the posterior slightly rounded; regularly convex above, the centre with a broad depressed longitudinal line of deepish punctures, the disk nearly smooth, and the sides with a few deep distant punctures. Scutellum minute, broad and rounded at the apex. Elytra as broad as the thorax, and about twice as long, the sides nearly parallel, the apex rounded; with nine elevated, rounded, longitudinal ridges on each elytron, and deep furrows between, the surface of the ridges slightly punctate, and the lateral margins rough, with minute crenulations. Legs short, with the fore tibiæ flattened

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and expanded towards the apex, striato-rugose above, with a series of small irregular teeth along the outer margin, and two larger teeth at the apex. The middle and posterior tibiæ sub-cylindrical, rugoso-striate, with one small stout tooth about the centre of the outer margin, and two small, more pointed teeth at the apex, placed close together. Underside of body pitchy brown, punctate.

Length $\frac{9}{10}$ inch.

This species somewhat resembles *Æ. chelifer* of Mac Leay, which differs in the deeper sulcation of the elytra, and in the shape of the mandibles, with only a tooth at the base.

Sp. 14. *Ægus punctiger*, W. W. S. (Pl. III. fig. 6.)

Black. ♀ with the head small, transverse, semicircular; constricted behind the eyes slightly, in front with a slightly projecting bidentate lobe, and a sharp-edged lateral plate crossing the eyes, notched near the centre of each eye; rounded above, coarsely punctured and shining. Mandibles shorter than the head, slightly incurved, with a sharp-cutting plate internally from the apex to about half the length, projecting in the shape of a broad triangular tooth. Antennæ moderate. Thorax quadrate transverse, with the fore angles acute, the sides slightly rounded outwards and the posterior angles somewhat rounded; regularly convex above, with a slight longitudinal central depression on the disk, deeply and coarsely punctured. Scutellum small, transverse, rounded at the apex. Elytra as broad as the thorax, with the sides nearly parallel, elongate, rounded at the apex, each elytron with five slightly elevated rounded longitudinal ridges, including the sutural ridge, and five flattened intervening spaces, the spaces divided from the ridges by a well-marked stria, the whole deeply and closely punctate, excepting the sutural ridges; somewhat shining and with a brownish tinge. Legs moderate, with the fore tibiæ flattened, and expanded towards the apex, striato-punctate above, with about six well-marked nearly equidistant teeth in the outer margin. Middle and posterior tibiæ hirsute, sub-cylindrical, striato-punctate, with three teeth on the outer margin before the centre and three at the apex, the latter having the marginal teeth less defined. Underside of body shining, coarsely punctate.

Length $\frac{7}{10}$ inch.

This species appears to be rare, as very few specimens have been sent home.

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IX. *Descriptions of two Species of the Genus* Hemerobius *of Linnæus, new to this Country, with Remarks on the Nomenclature of* Coniopteryx, *and on* Orthotænia Buoliana, *&c. By* John Curtis, Esq. F.L.S., &c.

[Read 7th August, 1854.]

Genus Sisyra, Burm.

terminalis, Curt.

Slightly pubescent; head and thorax shining, deep ochreous. Abdomen brown. Antennæ much longer than the body, capillary but slightly tapering, pilose and moniliform; black, about twelve of the terminal joints ochreous white, excepting the apical one, which is black. Wings slightly iridescent, superior tinted with smoky ochre, inferior colourless; nervures pilose, pale ochreous brown. Legs whitish ochre.

Expanse of wings 6 lines.

This very distinct species is at once distinguished from all the other *Hemerobii* by the pale terminal portion of the antennæ, comprising about one-quarter of the whole length. It associates with *H. fuscatus*, Fab., and *H. nigripennis*, Wesm.; which are characterised principally by the absence of transverse nervures in the wings, and have been constituted as the genus *Sisyra* by Burmeister. *H. terminalis* I discovered at the base of Turk Mountain, near the Lakes of Killarney, in a tour of the west of Ireland made in 1835 with my friend Mr. Haliday. The specimens were beaten out of an oak tree the 9th of July.

Genus Hemerobius, Linn.

dipterus, Burm.

Hispid, brown. Antennæ longer than the body, capillary, moniliform, pitchy and but slightly pubescent. Wings; superior rather small, elliptic, slightly tinged with ochre, nervures hispid and brown round the margins, the transverse ones forming irregular brown spots; inferior wings resembling two small oval lobes. Legs pale ochreous, knees pitchy.

Expanse 3½ lines.

This species, which is unique as British, was taken by J. C. Dale, Esq., off a hazel bush, outside of Breach-wood, Aller-hill, near Langport, Somerset, the 26th June, 1843.

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I avail myself of this opportunity to add that the species figured in the "British Entomology" (pl. 202), under the name of *H. fimbriatus*, is the *H. hirtus* of Linnæus; and the *H. crispus* of Schæffer appears to be the *H. angulatus* of Stephens and the *H. Hopii* of Dale's MSS. This last rare species Mr. Dale has taken at Lyndhurst the 15th April, 1830; and subsequently, June 27th, on hazel, in Caundle Holts, Dorset, where I also captured another specimen the 13th July, 1846.

As the settlement of nomenclature is daily becoming more necessary, being of the greatest consequence to science in every point of view, no opportunity should be omitted of correcting oversights. To the credit of France, every disposition is now shown to ascertain the correct and original names of species, and the same course is pursued in a measure in this country, but not with the care and impartiality I fear which is required. I will not now enter upon the subject to any extent, as it would lead me to a great length. I will merely state, 1st. That men of science, living in different countries and even in the same kingdom, cannot understand each other, from the differences in nomenclature as it now exists; 2ndly. That the pages of every work on species are complicated and wasted with synonyms; and 3rdly. That the most elaborate and careful memoranda of dates and localities are rendered doubtful or worthless from an unstable nomenclature.

Nomenclature of Coniopteryx.

On referring to one of the lists of the British Museum, to compare the *Hemerobii*, I regret to see that some names are changed which must be restored, amongst them *Coniopteryx* is changed for *Coniortes*, which renders it necessary for me to say a few words in order to restore the authorized name. The facts are these:—Early in 1834, Mr. Haliday sent me drawings of a larva which he believed to be that of the genus which I wished to publish, and proposed to call *Coniopteryx*. It would have appeared at once, but Mr. Haliday wished me to delay the publication until he had made farther researches, so that it was not actually published until the end of November. It is reported in the "Proceedings" of this Society, that, on July 7th, 1834, a communication was read "On *Coniortes*, a new British Genus of *Neuroptera*, belonging to the *Hemerobidæ*," by J. O. Westwood, F.L.S., &c.; but had not the Secretary of the day appended a note at the foot of the page, no one unconnected with the Entomological Society could have known what *Coniortes* was, in the absence of any description. The note referred to states, that "Since this Memoir was read, this genus has

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been published by Mr. Curtis in his "Illustrations" (pl. 528, Dec. 1834), under the name of *Coniopteryx*, and is placed in the family *Psocidæ*.

In justice to myself, I must state that I had no knowledge of Mr. Westwood's Memoir, which to this day has never been published that I am aware of; and my Paper, although only published the end of November and dated 1st December, had been prepared months before, as every one must know who has been engaged in a work where drawings and engravings have to be made, and plates printed and colored a considerable time in advance; and it is clear from the note quoted above that the Proceedings in which it was inserted could not have been published until after my Paper had been in the hands of the public.

The question, however, is, whether a mere printed name is to be adopted in preference to one published with elaborate dissections and descriptions, to establish a genus? I think not, and I believe such is the opinion of most genuine men of science.

The name of *Coniopteryx* has been adopted by Burmeister, Rambur, Westwood,* Haliday,† and even by Stephens, who had included the species originally in the wrong order, confounding it with the *Aleyrodes*;‡ and it is evident from Mr. Westwood having adopted my name that he would not have disturbed the established nomenclature had he been consulted in the compilation of the List alluded to.

The Entomological Society of Paris has ordered a book to be laid on their table, with a request that any one will correct the generic and specific names of insects, and show which ought to be the established name. This appears to me to be so judicious and useful, that I trust the same plan may be adopted by our Society, for I am convinced that questions which appear too trifling to be brought before the Society may thus be speedily, fairly and satisfactorily disposed of to the great advantage of science. If my suggestion should be acted upon, it will be necessary at certain periods for a committee to review the entries made in the book, and to print the names which it may appear just and right to them to be adopted, copies of which should be forwarded to the Paris

* Modern Classif. p. 48, 1839, the characters being copied from my Brit. Ent.

† Ent. Trans. vol. v. p. xxxii.

‡ Vide his Syst. Cat. pl. 2, p. 367, No. 9979. In his "Illustrations" (vol. vi. p. 115), Mr. Stephens has fallen into a strange error, which he never corrected. He prints Coniopteryx, *Leach*; what Dr. Leach could have to do with a group he probably never saw, remains unexplained; and on the following page Stephens says, "the genus was first characterised by Curtis."

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and other principal Societies with which the Entomological Society of London is in correspondence, in order that they may have an opportunity of giving their opinions; and thus we might obtain what is most essential,—a nomenclature universally adopted.

I have the pleasure of announcing, that during a recent visit to my friend Mr. Dale we took the males of *Acentropus Garnonsii* at Glanville's Wooton in some abundance. I found only one female, which was dead, and had rudimentary wings only; but since I left that neighbourhood, Mr. Dale has found other females, and it is my intention shortly to present a Paper to the Society regarding the economy of this remarkable and anomalous insect.

Orthotænia Buoliana, Wien. Verz.

Mr. May, of the Clifton Nursery, having given me a packet of the shoots of pine-trees infested with the larvæ of this *Tortrix*, I have bred a great number of both sexes, and I have considerable doubts whether the *O. Buoliana* and *O. Pinicolana* be any more than local varieties. The last I bred from fir-trees in the Regent's Park, where it used to be not uncommon on the paling.

With regard to the generic name *Orthotænia*, I do not hesitate to adopt it for this group, as in July, 1831, I published the genus,* giving *T. Turionella*, Linn.† as the type, from which species my characters and dissections were drawn; and in 1834 Mr. Stephens adopted this name for the same group in his "Illustrations."‡ It was not until 1845 that M. Guénée gave it the name of *Retinia*, and transferred that of *Orthotænia* to three species which never entered into my genus. Why Mr. Stephens, in his Museum List, should have followed M. Guénée, and abandoned the genus as given by him in the "Illustrations," does not appear.

I must not neglect to add, that before I adopted the name of *Turionella* for the insect I figured, I consulted the Linnean Cabinet, where I found the shoot of a fir-tree from which the moth had hatched, fixed by an old pin to the Linnean autograph, and two unset specimens of my insect by the side, labelled "Anglia, Hudson." It is therefore evident that the *Orthotænia* figured in the "British Entomology" was formerly, indeed in the time of Linnæus, accepted as the true *T. Turionella*.

* Brit. Ent. fol. and pl. 364.

† It is now said that my insect is not the Linnean species, and Mr. Doubleday has named it *O. Pinicolana*. At all events it belongs to the same genus, and that is sufficient to establish my generic name.

‡ Vol. iv. p. 178.

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With the moths I reared two parasites, one is a *Figites* and the other is a fine species of the family *Ichneumonidæ*. It is allied to Gravenhorst's *Cremastus confluens*, but as it does not agree with any of his species I shall describe it.

Genus Cremastus, Grav.

Buoliana, Curt.

Male black, orbits of eyes, clypeus and mandibles yellow, tips pitchy; palpi brown. Antennæ longish, tips of basal joints pale beneath. Thorax with a hooked yellow line on the shoulders; scutel yellow, sometimes with a black spot. Petiole long and clavate. Abdomen compressed; second, third and fourth segments with the margins more or less ferruginous; belly yellowish-white, banded with black beyond the middle. Wings very transparent, nervures and stigma fuscous. Legs yellow, including the coxæ; anterior legs tinged with ochre; hinder coxæ and trochanters black, tipped with ochre; thighs rusty, tipped with yellow; tibiæ yellowish; base and tips, as well as the apex of tarsi, brown.

Length $3\frac{1}{4}$ lines, expanse 5 lines.

Female with the face black, the yellow orbits narrow; scutel black, with a narrow yellow margin. Abdomen black; belly straw-colour, with four black bands; ovipositor shorter than the body; hinder thighs black, tipped with yellow.

Length $4\frac{1}{2}$ lines, aculeus $1\frac{3}{4}$.

Three males, and as many females, hatched the fourth week in July, after the moths had ceased to appear.

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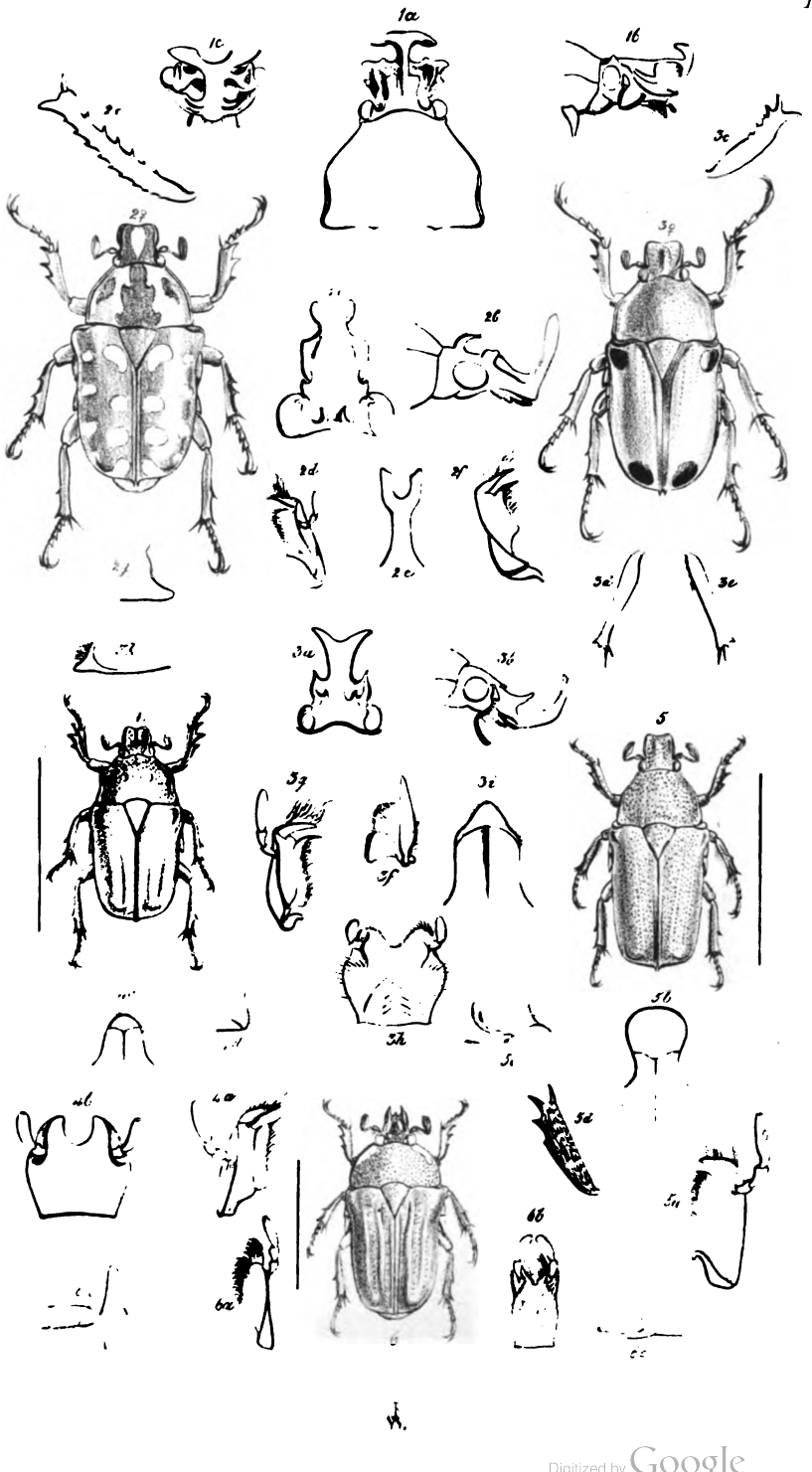

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X. *Supplemental Descriptions of Species of African, Asiatic and Australian* Cetoniidæ. By J. O. Westwood, F.L.S., &c.

[Read 5th June, 1854.]

Since the publication of my memoirs on the African and Indian Goliathideous *Cetoniidæ* in the "Arcana Entomologica," I have lost no opportunity of obtaining additional knowledge, not only of new species, but also of the sexual distinctions of such of the previously known species as had been known only by one or other (generally the male) sex. By this means I have been enabled to render our acquaintance with several interesting species complete, whilst the arrival of several totally new species affords me an opportunity of bringing the whole into a separate communication, which will, I trust, be regarded with interest as a supplement, not only to the memoirs above alluded to, but also to the several papers published upon the species of this family by Messrs. W. W. Saunders, Schaum and myself in the Transactions of our Society.

Goliathus (*Dicronorhina*) *micans*. (Pl. VI. fig. 1.)

Under the name of *Cetonia micans* a fine species of Goliath beetle, from Calabar, on the west coast of Africa, about 5° or 6° north latitude, was described by Drury in his Illustrations, vol. ii. pl. 32, fig. 3. Specimens of an African insect, captured in considerable numbers at the French settlement at Senegal, were regarded by Messrs. Gory and Percheron, Mon. Cet. pl. 25, fig. 2, as identical with the species of Drury. Relying, however, upon the precise description of Drury, I did not venture to regard the two insects as distinct—Arc. Ent. i. p. 172—retaining for Drury's insect the name of *C. micans*, and giving to the Senegal one the name of *C. cavifrons*.

A specimen of the true *C. micans*, in the collection of Mr. Melly, has enabled me to draw up a specific diagnosis of both insects, (Proc. Ent. Soc. 5 Nov. 1849, p. lxxxvii), and I now add figures of the head and thorax in different points of view, with the following distinctive description of *C. micans*.

Head wide, subquadrate, anterior margin produced in the middle in front into a broad erect horn, dilated at its sides, which extend outwardly nearly to the width of the anterior angles of the head. When seen from the front the upper edge of the horn is rather deeply marginate in the middle. Along the middle of the head runs a raised ridge or carina, the hinder half of which is margined

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with a flattened oblong disc, which, unitedly, occupy about half of the width of the head in the middle; the anterior half of the carina has on each side a deep wide excavation, occupying the greater part of the sides, and extending backwards nearly to the eyes. The sides of the head are armed with a small produced point, and the anterior margin has also a small conical projection between the middle and the produced lateral angles.

The figures represent the head and prothorax of *C. micans* seen from above (fig. 1 *a*), and the head seen sideways (fig. 1 *b*) and from the front (fig. 1 *c*).

Ceratorhina (*Amantodes*) *Passerinii*. (♀ Pl. VI. fig. 2.)

♂ Melly MS., Westwood, Arc. Ent. ii. p. 71, pl. 67, fig. 1, ♂. Bertoloni, Ill. Rer. Nat. Mozamb. Bonon. 1849.

♀ Schaum, in Ann. Soc. Ent. France, 2nd ser. vol. ii. pl. 11, fig. 1.

The figure of this species, which I published in the Arcana Entomologica, was made from a drawing of the male, communicated by Mr. Melly, whose manuscript name I adopted. Since the publication of that work I have had opportunities of examining specimens of both sexes, which have been received from Natal. The accompanying figures represent the details of the male, and the female with its details. The head of the male (fig. 2*a*, seen from above, and fig. 2*b*, seen sideways) is armed with two small curved acute horns between the eyes, a small truncated horn or tubercle on each side, in front of the eyes, and a strong compressed furcate erect horn in front (fig. 2*c*, the horn seen from the front). The maxilla of the male (fig. 2*d*) has the inner lobe simple and setose, and the outer lobe acute, horny and outwardly setose; and the fore tibiæ (fig. 2*e*) are long, curved, inwardly armed with about six small teeth, and outwardly serrated. The other tibiæ are simple.

The female (fig. 2 ♀) has the head simple, and the prothorax less developed; the anterior lateral angles are rounded and deflexed, and the front is rather emarginate in the middle. The maxilla (fig. 2*f*) has the inner lobe armed with a strong acute spine, and the outer lobe formed as in the male. The mesosternum (fig. 2 *g*) is slightly prominent and obtuse, the fore tibiæ strongly tridentate, the middle tibiæ bidentate in the middle, and the hind ones unidentate in the middle.

Goliathus (*Ceratorhina*) *Smithii*.

(♂ Mac Leay, Insects of South Africa, p. 34, pl. 1, fig. med.)

(♀ Pl. VI. fig. 3.)

The male of this fine species was first figured and described by Mr. Mac Leay, in the work above referred to, from a unique

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specimen brought home by Dr. A. Smith. Numerous specimens, however, of both sexes having been received from Natal, I am enabled to give the accompanying details of the male, together with a figure of the female and its details.

The head of the male (fig. 3*a*, the head seen from above, fig. 3*b*, the same sideways) has the anterior lateral angles porrected straightly forward and acute; the disc of the head is furnished with two small acute prominences, and the middle of the fore margin is produced into a large wide horn, curved upwards gradually, and furcate at its extremity. The fore tibiæ (fig. 3*c*) are curved, with the outer edge entire, and the inner edge finely serrated along its apical half, and with two stronger teeth, one at and the other below the tip; the intermediate tibiæ (fig. 3*d*) and the posterior tibiæ (fig. 3*e*) are simple, and slender beyond the middle.

The female (fig. 3 ♀) has the head and prothorax simple; the clypeus with the lateral angles rounded, and the anterior margin emarginate in the middle; the disc with a slightly raised central ridge. The legs are strong; the fore tibiæ strongly tridentate, and the intermediate and hind ones unidentate in the middle. The mandibles (fig. 3*f*) are of the ordinary form; the maxillæ, in this sex (fig. 3*g*), with the under lobe armed with a strong acute spine, and the outer lobe strong, horny, subacute and outwardly very setose. The mentum deeply emarginate in the middle of the front margin (fig. 3*h*), with very short palpi, with the sides, both in front and behind, rather narrowed; the mesosternum (fig. 3*i*, seen from below, and fig. 3*h*, seen sideways) is slightly produced, with its extremity almost triangular.

Asthenorhina Turneri.

(Westw. Arcana Entomologica, ii. p. 71, pl. 67, figs. 2, 3, ♂)
(♀ Pl. VI. fig. 4.)

Several specimens of this insect were received some years ago by J. A. Turner, Esq., two varieties of which were represented in the "Arcana Entomologica," as above referred to. I am now enabled to complete our knowledge of the species, a female having been obtained by Captain Parry. It is eleven lines long, of a rich dark green colour and shining; the front half of the head black, and the hinder part green; the antennæ black. The head is closely punctured, the anterior and lateral margins are elevated, the former emarginate in the middle, a central carina is slightly elevated, the hind part of the head above is less closely punctured; the prothorax is punctured at the sides and in front; the epimera

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are scarcely visible from above; the scutellum is not punctured; the elytra, under a lens, are very finely punctured, the punctures wide apart. The shoulders and subapical tubercles of the elytra are black, the podex punctured closely. The body beneath is dark green and polished, slightly and finely punctured, except the sides of the metasternum and coxæ, which are closely punctured. The legs are dark green, the spines of the fore tibiæ black, the four hind tibiæ black, slightly glossed with green, with the tarsi black.

The maxillæ in the female (fig. 4*a*) have the inner lobe not armed with an acute tooth, being but slightly produced, the outer lobe is acute and horny; the mentum (fig. 4*b*) is widest in the middle, the anterior margin deeply emarginate in the centre; the mesosternum (fig. 4*c*, seen from beneath, fig. 4*d*, sideways) is very slightly produced and obtusely rounded.

Tmesorrhina Saundersii, Westw. n. s. (Pl. VI. fig. 5.)

Viridis, fortiter nigro-punctata, capite antice vix emarginato, epimeris viridibus, nec aureis; pedibus nigro-viridibus, tarsis omnibus nigris. ♀

Long. corp. lin. 12 (unc. 1).

Habitat in Africa tropicali occident. In Mus. Saunders.

This species is intermediate in size between *T. concolor*, Westw. (*Thoreyi*, Schaum), and *Iris*, Fab. (*amabilis*, Bainbridge). It is of an uniform rich dark green colour, densely punctured with black punctures, those of the head being very close together, and some of those of the disk forming a few irregular lines. The head is oblong, the anterior lateral angles rounded, the front margin very slightly emarginate. The antennæ black, with the basal joint dark green. The maxillæ (fig. 5 *a*) with a very short point at the extremity of the basal lobe, and with the upper lobe rather obtusely pointed. All the palpi are black, the mentum dark green, deeply punctured and clothed with black hairs, with the front very deeply emarginate. The pronotum is less conical (wider behind) than in *T. concolor*, being nearly of the shape of that of *T. Iris*. The scutellum is also more equilaterally triangular than in *T. concolor*, and moderately punctured except at the tip. The elytra are elongate, subparallel, thus resembling *T. concolor*, being but little narrow behind, punctured as in *T. Iris* (but rather more coarsely), and with similar short curved strigæ near the extremity of the lateral and sutural margins. The legs are dark green, with black punctures and strigæ; the anterior tibiæ are not strongly tri-

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dentate, although the unchannelled under surface of the abdomen indicates the specimen to be a female. The body beneath is dark green and punctured; the middle of the metasternum and base of the abdomen tinged with golden colour. The sternum differs in form from that of the two other species, being rounded and widest in front (fig. 5*b*, 5*c*).

The unique specimen from which the above description was made is in the Collection of W. W. Saunders, Esq., F.R.S., &c., who pointed it out to me as distinct from the two present known species, and with whose name I have therefore specifically described it.

Gnathocera Angolensis, Westw., n. s. (Pl. VI. fig. 6.)

Gn. capite nigro albo-guttato, antice bifido; pronoto convexo, scutello elytrisque fulvis, lateribus pronoti antice albis, corpore subtus olivaceo-viridi, stramineo variegato. ♀

Long. corp. lin. 8.

Habitat in Angola, Africæ tropicali occidentali.

In Mus. Westwood. Communic. D. Turner.

This new species is of the same size as *Gn. trivittata*, but is rather wider across the hind part of the prothorax and base of the elytra. The head is black, glossy and punctured; the punctures forming short striolæ on the anterior half of the head, which is attenuated, the lateral anterior angles forming two porrected points, which are subprismatical and rather hollowed out on the outside; the middle of the narrowed anterior margin is also produced into a short conical point. The disk of the head is marked between the eyes with two small white round spots; there are also two still smaller, close to the eyes, behind, and two oblong patches running parallel with the sides of the head. The antennæ are black, with the clava pitchy. The maxillæ are elongated, and both the upper and lower lobes are armed with a number of very strong curved spines (fig. 6*a*). The mentum is oblong, hairy outside, and with a very deep triangular incision in front (fig. 6*b*). The pronotum is short and broad, the lateral margins regularly rounded and not elevated at the hinder angles; the disc is entire and finely but numerously punctured. The scutellum is elongate, triangular, nearly smooth. The elytra are but slightly punctured on the disk, but more strongly so at the sides and towards the apex, where the punctures become elongated curved striolæ. The suture is elevated as well as two longitudinal carinæ on each elytron, the interior being the most decided. The pronotum, scu-

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tellum and elytra are of an uniform fulvous colour, with the sides of the pronotum marked with a white streak for about half their length from the anterior angles. The body beneath is of an olive black colour, the thoracic portion with large pale buff spots, and each of the four basal segments of the abdomen with a broad, buff, transverse, velvet-like bar on each side, leaving the middle naked and polished; they are not channelled down the middle, the specimen being a female. The legs are black; the femora with a broad buff longitudinal stripe. The anterior tibiæ are tridendate, and the four posterior ones have a short spine in the middle on the outside. The mesosternum is long, narrow and pointed, the tip being slightly deflexed and extending as far as the front of the anterior coxæ (figs. 6*c*, 6*d*).

There are specimens of the male of this species in the British Museum Collection, also presented by Mr. Turner, which agree with the female in the structure and toothing of the tibiæ (except that the intermediate ones are slightly curved) and in the cornuted structure of the head. The centre of the ventral surface of the abdomen is, however, longitudinally impressed throughout its whole length with a row of pale buff spots down the middle, and the face is more strongly marked with larger buff spots, leaving in fact only a slender black trident on the forehead.

Heterrhorhina bicostata, Schaum. Trans. Ent. Soc. Vol. V. p. 65. (Pl. VII. fig. 1.)

The great general similarity between the green species of this genus renders it advisable that figures should be given of each, thus insuring their identification more completely than can be effected by short descriptions. The unique specimen of this species described by Dr. Schaum is in Captain Parry's Collection. It is a male, and is represented in the accompanying figure (Pl. VII. fig. 1) of the natural size. It is of a golden green colour, with the scutellum and suture of a richer golden colour. The front of the clypeus is black; the first joint of the antennæ green, the remainder pitchy red; the tarsi are black. Beneath, the body is green, the middle being tinged with golden colour; the sides of the metasternum closely but finely punctured; the abdomen with a slight oblong-oval impression, extending along the middle of the second and third, as well as the extremity of the first and base of the fourth, ventral segments, all of which are also marked with a row of punctures across the middle. The clypeus is nearly quadrate in front, with the sides slightly angulated. The maxillæ have a short spine at the extremity of the inner lobe, and

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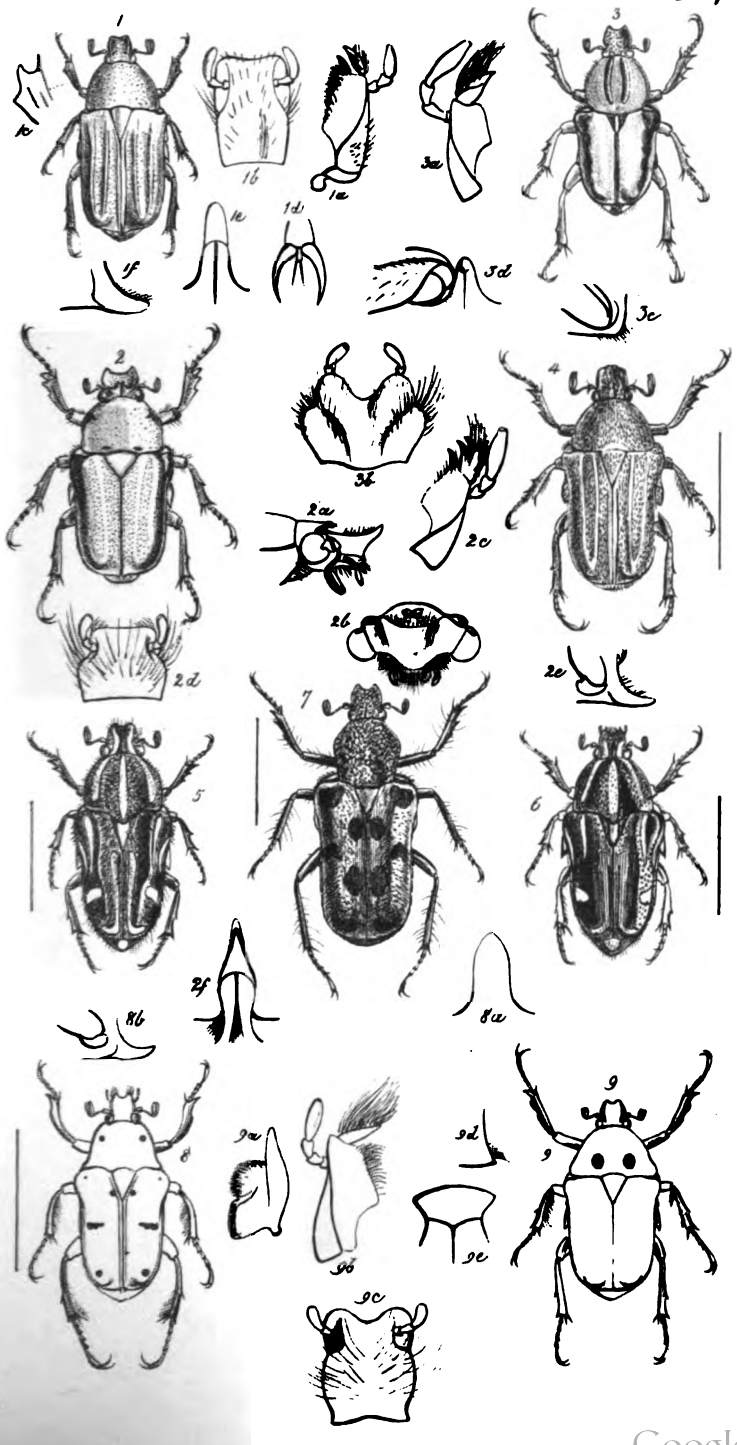

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the outer lobe is but slightly setose (fig. 1 *a*). The mentum is oblong, scarcely emarginate in front (fig. 1 *b*). The anterior tibiæ have an obtuse tooth beyond the middle (fig. 1 *c*). The tarsi have a minute bisetigerous pulvillus between the claws (fig. 1 *d*), and the mesosternal process is long, narrow, rounded at tip, and rather deflexed (figs. 1 *e*, 1 *f*).

Genus Narycius.

Sub-genus novum Platynocephalus, Westw.

Characteres e fœmina (solum adhuc visa) deprompti. Color haud metallicus.

Caput latum, antice late concavum, angulis anticis paullo porrectis et acutis, vertice spina parva bifida acuta plana armato (fig. 2 *a*, caput a latere; fig. 2 *b*, antice visum). *Maxillæ* (fig. 2 *c*) elongatæ, lobo basali dente valido apicali curvato armato, lobo apicali dentibus duobus similibus armato. *Mentum* latum, dimidio apicali multo angustiori, margine antico fere recto; palpis brevibus (fig. 2 *d*). *Pronotum* convexum, latum lateribus rotundatis, posticè sub-rectis. *Elytra* basi pronoto latiora brevia, subdepressa. *Mesosternum* acutum, conicum, porrectum (figs. 2 *e*, 2 *f*). *Pedes* breves, crassi; tibiæ anticæ tridentatæ, posticæ quatuor dente medio unico; tarsi pulvillo bisetigero inter ungues instructi.

The insect which has served for the establishment of the sub-genus proposed above is unfortunately a female, so that we are unable to point out the precise distinctions between it and the Indian *Cyphonocephalus*, Westw. (Arc. Ent. i. p. 115, pl. 33, fig. 2 and details), of which only a single male is known. From the typical *Narycius opalus* it differs in the upper lobe of the maxillæ having only two strong curved horny spines instead of three, and the mentum is not so conical, nor is it emarginate in front. As these characters exist in both sexes of *N. opalus*, we are perhaps justified in considering that the female of *Cyphonocephalus* will also agree with the male in having a tridentate upper lobe to the maxillæ, and an emarginate mentum. These characters, therefore, in addition to the want of metallic colouring, will distinguish *Platynocephalus* from *Cyphonocephalus*.

Narycius (*Platynocephalus*) *Hamiltoni*, ♀. (Pl. VII. fig. 2.)

Supra fulvus, nitidus, subplanus, tenuissime punctatus; capite antice concavo, dense punctato; pronoti lateribus nigro tenue-

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marginatis, marginibus nigris lateralibus in medio paullo intus dilatatis, punctisque duobus transversis prope scutellum positis; scutello elytrisque flavescentibus nigro-marginatis, his tenue punctatis, sutura vittisque duabus longitudinalibus lævibus; corpore infra nigro, sterno, femoribus, epimeris, coxisque posticis extus fulvis, abdomine castaneo.

Long. corp. lin. 14.

Habitat in India orientali, Moulmein.

In Musæo Societatis Entomol. Lond. Commun. Domina Hamilton.

The upper side of the head is fulvous, coloured and very glossy; the concave anterior portion strongly punctate and sparingly clothed with luteous setæ; the hind part smooth in the middle, punctate at the sides; the front and side margins have a slender edging of black, and the tips of the two points on the forehead are also black. Antennæ black; club dark chesnut; epistoma fulvous. Underside of the head, with the mouth, pitchy black; palpi dark chesnut. Pronotum rich fulvous, with a slender black margin; disc glossy, with very minute punctures, most numerous towards the anterior angles: near these angles the dark margin is slightly extended into the disk, and there are also two small dusky transverse narks near the hinder margin. Scutellum orange-coloured, flat, glossy and nearly impunctate. Elytra pale buffish yellow, outer margin rich brown, with a narrow black suture and a black submarginal line extending to the humeral angles, which are entirely black; disc finely punctured, the punctures forming a line on each near the suture, and four lines on the disc, leaving two intermediate spaces smooth; the intervening spaces with the punctures irregular. Pygidium densely punctate, dark chesnut. Body beneath black, with fine fulvous hairs; sternal mucro rich fulvous, as well as the exposed portions of the scapulæ and of the hind coxæ; femora also rich orange, with the extreme tip black. Tibiæ and tarsi black, terminal joints of the latter broadly fulvous at the base. Abdomen rich chesnut, less strongly punctate than the metasternum.

The Entomological Society of London is indebted for the unique specimen of the female of this insect to Mrs. Hamilton, who has very liberally enriched the Society's Collection with great numbers of fine insects from India. It is to be hoped that we may shortly receive the male from the same quarter.

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Dicronocephalus Wallichii, Hope, in Gray's Zool. Misc., 1831, p. 24.

(Westw. Arc. Ent. i. p. 5, pl. 1, fig. 4, ♂.)
(♀ Plate VII. fig. 3.)

Of this fine insect (the analysis of the mouth of which was first given, with a figure of the male, in the Arcana Entomologica), the male only was known from specimens captured by the late Dr. Wallich. Mr. Fortune having, however, been so fortunate as to re-discover the insect in North China, and to meet with both sexes, I am enabled to give a figure of the female (Plate VII. fig. 3), which differs very widely, in general appearance, from the male. The head above is concave, and thickly and coarsely punctured; the front part is somewhat quadrate, with the anterior lateral angles produced into rather obtuse points, between which the fore margin is emarginate; the sides are swollen in the middle; above, the head is chesnut red, slightly glossy, with the hind part between the eyes obscure black, with two small, dull, whitish spots. The pronotum is covered with dull, opaque, dark greenish-yellow pile, except two raised, slightly curved, longitudinal bars, which are black, glossy, and finely punctured; the lateral and posterior margins are slender and raised. The scutellum is black and punctured, with a narrow, central, luteous line. The elytra are covered with the same kind of pile as the pronotum, with a narrow dark streak along the suture at the humeral angles, an irregular longitudinal stripe extending thence to the subapical tubercle, and the lateral narrow raised margin, all of which are black. The podex is chesnut, redder at the tip, finely punctured, with a luteous patch on each side. The body beneath is black, the meso and metasterna spotted with buff, as well as the sides of the posterior coxæ; the anterior coxæ are black, chesnut in the middle of the front side. All the femora are chesnut red beneath, with the upper edge black, as well as the tips. The anterior tibiæ are black, chesnut red beneath, and along the inner margin; the four posterior tibiæ are chesnut red, black at the base and tips. The tarsi black, and with the base of the 3rd and 4th joints, and the greater part of the 5th joint, fulvous. The maxillæ (fig. 3 *a*) are unarmed at the tip of the lower lobe; the upper one is, however, acutely pointed at the tip. The mentum is broad, the middle of each side much and roundly dilated, the fore margin deeply emarginate (fig. 3 *b*.) The mesosternum is not produced into a porrected point, although it is of a conical form (fig. 3 *c*, 3 *d*).

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Cosmiomorpha setulosa, Westw. n. s.

(Plate VII. fig. 4.)

Nigro-castanea, nitida, punctatissima, setis luteis (e punctis) obsita; scutello, sutura, costisque duabus in singulo elytro nudis, capitis margine antico maris in medio parum producto et recurvo, pedibus mediocribus, maris haud intus serratis, extus subtridentatis. (*m.* et *f.*)

Long. corp. lin. 8½.

Habitat in China septentrionali. D. Fortune.

In Mus. Westwood, &c.

This species is considerably smaller than the type of the genus *C. modesta*, described by Mr. Saunders in the 2nd Volume, N. S., of our Transactions, p. 29, pl. 3, figs. 1, 2, and exhibits in a much less marked manner the sexual peculiarities of the genus as shown in the type, the prothorax of the male being scarcely angulated at the sides, and the fore legs, with the tibiæ and tarsi, shorter, the former part being almost destitute of the inferior crenulation, but the outer edge is more distinctly bidentate; the joints of the tarsi are also destitute of the produced point on the underside. (See Pl. III. fig. 1*d*.)

The upper surface of the body is thickly covered with very minute punctures, each emitting a small luteous seta. The head has the anterior angles rounded, the front margin elevated in the middle and acute, the middle of the elevated part slightly emarginate, the disc concave. Between the eyes is a small central, raised, and polished carina. The antennæ and palpi are pitchy. The prothorax is almost conical in form, with the anterior truncation narrow; the sides very slightly rounded and slightly margined behind; the hinder angles rounded, the hind margin nearly straight. The scutellum and suture black; the former but slightly punctured and setose, the latter with two longitudinal carinæ, down the disc of the elytra, glabrous and impunctate. The epimera strongly setose. The shoulders of the elytra much wider than the hind part of the pronotum. Legs of moderate length. The fore tibiæ in both sexes with the external margins tridentate. The body beneath is clothed with longer luteous setæ, especially at the sides. The mesosternal process (formed as in *C. modesta*), as well as the centre of the abdomen (which is but slightly channelled in the male), nearly naked and impunctate.

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Macronata fraterna, Westw. (Pl. VII. fig. 5.)

M. nigra, fulvo-vittata; clypeo, antennis, palpis pedibusque testaceis, pronoto antice subrotundato, lateribus postice fere parallelis, medio discī postice paullo depresso. ♀

Long. corp. lin. 7.

Habitat in Insulis Phillippinensibus. In Mus. Britann.

Head strongly punctured, black, glossy. Clypeus pale testaceous red, finely setose; setæ luteous, anterior angles rounded, middle of fore margin emarginate; a rich velvety yellow striga runs on each side nearly the whole length of the head, leaving the black central portion narrow and slightly carinated, glossy and impunctate. Antennæ and palpi pale castaneous. Prothorax about one-third wider than the head, the anterior portion rounded; the sides in the hinder half are nearly parallel, so that the greatest width is across the middle; the disc is opaque, being entirely covered with minute punctures emitting fine black setæ; the middle of the hind margin is moderately prolonged behind, being sinuated on each side, the sinuated portion being rather raised and very glossy; the middle of the disc is slightly depressed from the middle to the hind margin; down the middle of the pronotum extends a golden yellow opaque longitudinal stripe, rather widened behind, and on each side is a curved stripe of similar width and colour, nearly parallel with the lateral margins of the prothorax. The scutellum is almost covered with a golden yellow patch pointed behind. The elytra are depressed in the region of the scutellum, and along the suture they are black, densely covered with minute short impressed striolæ emitting black setæ, and each is marked with a narrow golden yellow stripe extending from near the apex of the scutellum, parallel with the suture, near to the apex, where it is curved outwardly, following the outline of the apex, but not extending to the outer margin. On each side of the humeral callus is a short, slender, rather curved, golden yellow stripe, and beyond this a golden yellow marginal spot. The podex is black, opaque, finely setose, with a small circular golden spot. The underside of the body is black and glossy; the central part of the body almost impunctate; the sides more thickly punctured, the abdominal portion with large punctures. The sides of the prosternum, the anterior and posterior margins of the metasternum on each side, a patch on the anterior margin of the posterior coxæ, and three fasciæ on the abdomen, widely interrupted in the middle, all golden yellow; the legs are rich chesnut red.

The remarkable similarity between this insect and *M. regia*,

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Fabricius, induces me to add a comparative description of the two species, together with a magnified figure of each. The figures given by Messrs. Gory and Percheron (Mon. Cet. p. 315, pl. 62, figs. 2 and 3) of *M. regia*, Fab., and *M. depressa* (which is the dark state of the species, *M. regia* being a red, probably an immature, specimen), agree with the insect represented by me in Pl. VII. fig. 6, especially in the rounded form of the prothorax. Their specimen of *M. depressa* was from Calcutta, and that of *M. regia* was from the East Indies. In their description of the latter they are silent as to the two short slender pale lines near the shoulder of each elytron, but M. Guérin's excellent figure (pl. 62, fig. 3) exhibits them.

The specimen of *M. regia*, Fab., represented in our Pl. VII. fig. 6, is a native of Moulmein in the East Indies, and has been presented to the Entomological Society of London by Mrs. Hamilton.

Macronota fraterna, Westw.	*Macronota regia*, Fab., Burm., Schaum. ♀ Var. *M. depressa*, Gory and Perch. t. 62, f. 2.
Habitat Phillippine Islands.	Habitat Continental India.
General form narrow, much attenuated behind.	General form wider, more ovate behind.
Pronotum widest across the middle, disc densely setose, with a slight central impression behind; closely covered with minute punctures, lateral yellow stripes curved.	Pronotum widest behind; disc nearly naked, with a deep wide impression extending nearly from the fore margin to the scutellum, gradually widening; disc with large punctures, showing the polished surface between them; lateral yellow stripes nearly straight.
Elytra with the outer margin velvety; impressed part of the disc densely covered with minute short oblique striolæ, which are setigerous.	Elytra nearly naked and polished throughout; outer margin rather deeply punctured; impressed part of the disc with fine close longitudinal impressed lines running through the two yellow stripes.
Outer part of the two central lateral yellow spots extending backwards.	Outer part of the two yellow spots in the middle of the sides extending forwards.
Podex with a round yellow spot.	Podex with a semicircular yellow spot.

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Macronota setipes, Westw. n. s. (Pl. VII. fig. 7.)

M. elongata, elytris subparallelis, nigra, capite et pronoto vermiculatis, elytris medio longitudinaliter depressis, rufis, nigro-maculatis, apiceque nigris, tenuissime strigulosis; pedibus elongatis gracilibus, setis longis paucis instructis ♂.

Long. corp. lin. 7.

Habitat in China septentrionali. D. Fortune.

In Mus. Britann.

This species agrees in size and elongated form with *M. elongata* of Gory and Percheron, Mon. Cet. p. 327, pl. 64, fig. 6, from Calcutta. With the exception of the elytra it is entirely black. The head is rugose, with a very slender short polished carina in the middle, between the eyes. The elypeus is rounded at the sides, and deeply angularly emarginate in the middle. The antennæ and palpi are black, the clava of the former dark chesnut. The pronotum is vermiculato-rugose; it is subheptagonal, being widest across the middle; the middle of the hind margin is rounded, and the disc in front of this part is flat. The elytra are oblong, dark red, with about one-sixth at the apex black. The suture is also black, each elytron also with four black spots, one on the shoulder, another smaller lateral above the hind femora, a third near the extremity of the scutellum, and a fourth beyond the middle, the two latter joining the suture; they are nearly opaque, the disc marked with numerous very fine slender lineolæ, those in the middle being longitudinal, those on the side transverse, and those near the apex curved and circularly arranged round the subapical callus, which is prominent. The podex is covered with fine striolæ, similarly arranged. The body beneath is black and glossy, and but slightly punctured; the metasternum is marked with a longitudinal central impressed line, and its sides and front rather thickly clothed with luteous hairs. The abdomen is widely flattened along the middle, but not channelled. The legs are long and very slender, the tibiæ emitting a few very long slender setæ.

Eupœcila ochracea, Westw. n. s. (Pl. VII. fig. 8.)

S. supra ochraceo-flava, glabra, nitida; pronoto macula parva submarginali utrinque ante medium; elytris maculis 4 nigris, pedibus fulvis; metasterno abdomineque nigris, cinereo dense setosis.

Long. corp. lin. 9.

Habitat in Nova Hollandia.

In Mus. Britann.

Size of *E. punctata*, Donovan, but with the body slenderer, the

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elytra more attenuated behind, and the legs longer, above of an ochraceous yellow colour. Head above finely punctured; the clypeus elongated, the sides rounded and slightly elevated, the front margin with a deep, nearly angular incision. Antennæ, palpi and parts of the mouth concolorous; prothorax subconical, slightly dilated in the middle of the lateral angles, and with the posterior angles slightly produced outwardly; disc slightly convex, highly polished, and nearly impunctate; middle of the hind margin slightly emarginate, for the reception of the scutellum: on each side of the disc, opposite the subdilated part, is a small black spot; scutellum glabrous: elytra with the shoulders very much dilated, behind which they are gradually attenuated to the extremity; the disc is very glabrous and scarcely punctured; the suture depressed from the base for about half its length, within each of the humeral angles is a minute black dot, and there is another on each elytron near the apex of the scutellum; another, larger and transverse, is placed rather beyond the middle of each elytron, and a nearly round one towards the apex. The podex is very convex, covered with fine strigæ, arranged circularly, with an oval black dot in the centre. Beneath the prosternum, mesosternal process ovate, with the extremity slightly pointed (fig. 8 *a*, 8 *b*); front of the metasternum and posterior coxæ yellow, the remainder of the metasternum and the abdomen black, glabrous, punctate, and thickly clothed with cinereous hairs. The legs are long, slender and fulvous.

Whether this be a variety of *E. octo-punctata*, Hope, MS., I have not at present means of clearly determining; it seems, however, to agree in general with Burmeister's short description (Handb. iii. p. 540), except in the maculation of the prothorax and elytra.

Eupœcila succinea. (Pl. VII. fig. 9.)

The short description given by Mr. Hope of this species (*Schizorhinas*, Trans. Ent. Soc. vol. iii. p. 281) contains no description of its structural details. No figures have indeed hitherto been published of the characters of the genus; I therefore take this opportunity of adding a figure of this species, with details taken from the male in Mr. Hope's Collection. Fig. 9 *a* represents one of the mandibles; fig. 9 *b*, one of the maxillæ, the inner lobe being simple, whilst the upper one is acute and horny at the tip; fig. 9 *c*, the mentum rather wider in front than at the base, and somewhat cordate punctate, the middle of the fore margin being emarginate; fig. 9 *d* and fig. 9 *e*, the mesosternal process, seen from beneath and sideways, which is wide, and with the anterior lateral angles acute.

This species is a native of the Swan River.

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XI. *Notes on the Species of* Amycterus *and Allied Genera, with Descriptions of some New Species. By* Geo. R. Waterhouse, Esq., F. Z. S.

[Read July 3rd, 1854.]

Order COLEOPTERA.

Section Curculionides.

Sub-section Cyclomides, Scho.*

Proposing from time to time to lay before the Society certain notes, which I imagine may facilitate the study of this division of the *Curculionides*, I will commence with those species which are now arranged under the generic name *Acantholophus*. The species of this group are for the most part very similar to each other, and undoubtedly are difficult to distinguish through the published descriptions, on account of the differential characters not being brought forward in any prominent manner: having, however, had an opportunity of examining nearly all the original types described in Schönherr's work—these types being in the Rev. Mr. Hope's collection, now at Oxford—I have been thereby enabled to throw them into a tabular form, which table I now lay before the Society, hoping it may help those who may wish to study the group.

Acantholophus (Mac Leay), Schönherr.

I. With bifurcated spine over the eye :

A. With three rows of tubercles or spines on each elytron, the outer row consisting of four or more tubercles or spines.

a. Without sub-apical spines.. *suturalis.*
lateralis.†
Marshami.
Adelaidæ, Wat., n. sp.
planicollis, Wat., n. sp.

b. With sub-apical spines .... *hypoleucus.*

* The Australian *Curculionides* with a six-jointed funiculus to the antennæ, including the genera *Euomus*, *Mythites* (*Acanthomus*, Germ.), *Tetralophus*, Wat., *Amycterus*, and *Acantholophus*, form a very distinct and natural group, which might be called *Amycteridæ*. The so-called *Brachycerus Australis* of Germar also belongs here.

† *A. lateralis* has a single large humeral spine, whilst *A. suturalis* has two or three very small spines on the humeral angle of the elytra.

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B. With two rows of tubercles, and with but two well-developed tubercles in place of the four, or more, of outer row in sect. A... *hystrix.*
bivittatus.

II. With simple tubercle over the eye, and two approximated acute tubercles at base of rostrum ..... *cœnosus.*

III. With simple tubercle over the eye:

A. Thorax depressed, the sides produced into lateral spines, or into a dentate ridge:

a. With three rows of tubercles on each elytron ..... *dumosus.*

b. With two rows of tubercles to each elytron, and a single post-humeral lateral spine *aureolus.*

c. Elytra subgranular — no strongly developed tubercles ..... *granulatus.*

B. Thorax more or less convex, and without distinct lateral ridges .. *Bohemani.*
scotobioides, Hope.
morosus, Germ.
Dohrnii, Wat. nov. sp.
crenicollis, Wat.nov.sp.

The species forming this last section (III. B.) are intermediate in their characters between *Amycterus* and *Acantholophus*, and perhaps on the whole would be better placed in the former genus. They form a natural little group; all the species have the rostrum more or less crested or ridged at the sides, the ridge most elevated above the eye. Of the *A. scotobioides* of Hope's MSS. I have but a short note, to the effect that it closely resembles *A. Bohemani* in its general characters, but is distinguished by the elytra being bent suddenly down at the apex, so as to form a right angle with the dorsal surface; and that at this part the elytra have, on either side, a distinct tubercular keel or ridge; the ridge commences on the fifth interstice of the striæ, towards the middle, and vanishes before reaching the apex.

Acantholophus Adelaidæ.

Ac. oblongus ater, fusco-squamosus, fronte utrinque tuberculis duobus basalibus subspiniformibus, connatis, instructo; thorace dorso seriatim bifariam tuberculato, lateribus acute tri-

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tuberculato ; elytris transversim rugosis trifariam tuberculatis, tuberculis parvulis, posticis, majoribus, conicis.

Long. corp. rostr. incl. 8 lin.

Patria Nova Hollandia, ad "Adelaide."

This species belongs to section I. A. *a.* of the table, and is at once distinguished from others of that section by the small size of the tubercles, which are arranged in three rows on the elytra ; it should follow *A. Marshami* in the series.

The forehead is depressed, and separated from the rostrum by a transverse ridge, which is subinterrupted in the middle: the rostrum is bounded on either side above by a ridge, which is produced into a vertical bifurcated process immediately in front of the eye, the process is somewhat recurved and rather acute, and the anterior division of the bifurcation is small: the same lateral ridge of the rostrum is again produced in front, above the point of the insertion of the antennæ, so as to form a conical tubercle at that part: two ridges extend from the base of the rostrum above, where they are separated by a groove, and diverge as they proceed forwards towards the two conical tubercles last mentioned. The thorax is about equal in length and breadth, and about half the width of the elytra: its broadest part is rather in front of the middle; the dorsal surface is moderately convex, and presents two rows of about six tubercles, and these are conical, if we except the two foremost, which form short crests, in front projecting partly over the head: besides these, there is a small tubercle on the fore part, about midway between the middle and the lateral margin; the sides of the thorax are provided with three acutely conical tubercles, two of which are united at their bases, and are situated rather in front of the middle line; the foremost of these is the larger, and the third tubercle is placed about midway between these and the base; a transverse groove is seen towards the fore part of the thorax, and a similar groove is situated towards the hinder margin. The elytra are oblong ovate; convex, and slightly mucronate at the apex: they are somewhat irregularly punctate-striate, and transversely rugose, the interstices have minute tubercles, in series, but there are three rows of more distinct tubercles (very small as compared with most other species of the genus); of the innermost row, which belong to the second interstice, the tubercles are scarcely more apparent, on the basal portion of the elytra, than those of the adjoining interstice, but on the posterior half there are four or five, which are larger, and the hindermost of these is the largest, and of a conical form (the

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others being obtuse); it is situated rather behind the commencement of the posterior third of the elytra; there are no tubercles behind this part. All the tubercles of the second row are nearly equal, but the hindermost are a little more elevated, and somewhat acute. The outer row vanishes on the hinder half of the elytra. The abdomen beneath is almost destitute of scales: the segments present some very minute scattered punctures, besides which, on the first and second segments, as well as on the postpectus, are numerous transverse rugæ, but these are extremely delicate.

Acantholophus planicollis.

A. oblongus, niger, fusco-squamosus; capite tuberculis minutis postice instructo, rostro utrinque crista interrupta, oblique elevata, instructo: thorace dorso depresso, tuberculis parvulis (vel granulis) irregularis adsperso, lateribus tuberculato: elytris apice conjunctim rotundatis, dorso subdepressis, punctato-striatis, intersticiis seriatim granulatis; intersticiis 2 et 4 postice tuberculis parvulis conicis, parum elevatis, tuberculisque duobus ad suturam ante apicem, instructis.

Long. corp. rostr. incl. 8 lin.

Patria, Nova Hollandia, ad "Adelaide."

This species is closely allied to the preceding, but is readily distinguished by the absence of the two rows of distinct tubercles on the disc of the thorax, and the flatness of the dorsal surface, and the small size of the tubercles on the sides of that segment, together with the presence of a sutural tubercle at some little distance from the apex of the elytra. The crest on each side of the rostrum is not produced into spines: it is, however, considerably elevated, notched near the middle, and again between this point and the front; the posterior half of the crest terminates behind in an acute point, and is slightly recurved; a transverse impression separates the head from the rostrum, and there is a short longitudinal groove at the base of the latter: on the back part of the head are two small tubercles. The thorax is nearly flat above, has a transverse impression towards the front, and another behind; besides which is a shallow depression, in which is a central ridge, along the mesial line: there is a series of 3 or 4 smallish conical tubercles on the lateral margin. The elytra are elongate-ovate, the shoulders rounded, the sides sub-parallel in the middle portion. The abdomen is tolerably well clothed with brown scales. The minute scattered tubercles and granules on the thorax vary in

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different specimens, in some there being very few, whilst in others they are somewhat numerous; and, further, in the colouring there is some amount of variation, the scales in some being grey, in others brown or rufous-brown—not unfrequently the elytra are variegated with black.

Amycterus crenicollis.

A. oblongus, ater, cinereo-squamosus; fronte longitudinaliter ruguloso, granulis setiferis adspersis et utrinque tuberculo conico, instructo; rostro basi transversim impresso; thorace parvulo, subrotundato, supra parum convexo, canaliculato, granulis setiferis sat crebre obsito, lateribus seriatim tuberculato: elytris punctato-striatis, interstitiis convexis seriatim granulatis, granulis setiferis, squamulis cinereis nigrisque vestitis.

Long. corp. 6 lin.

Patria, Nova Hollandia, ad Swan River.

This species is very close to *A. Bohemani* and *A. morosus*, but may be distinguished from either by the thorax being distinctly ridged at the sides; the ridge being broken up into a series of conical tubercles, most of which are small, but near the centre is a comparatively large tubercle, which is followed behind by a strong notch. The granules in the thorax are distinctly larger than in the same part of *A. morosus*; the thorax, moreover, is proportionally smaller, and is less convex. Whether to place this species in the genus *Amycterus* or in *Acantholophus*, I find it somewhat difficult to determine; its characters are, in fact, intermediate.

Amycterus Dohrnii.

A. oblongo-ellipticus, niger, cinereo-squamosus; fronte longitudinaliter rugoso, granulisque setiferis paucis obsito, utrinque subcristato; rostro basi profunde transversim impresso; thorace sat crebre granulato, postice lateribusque tuberculis nonnullis obsito, dorso canaliculato; elytris striato-punctatis, interstitiis granulatis, postice tuberculis parvulis conicis seriatim obsitis, in interstitio 2° tuberculo magno, subspinoso, ante apicem instructis.

Long. corp. 7 lin.

Patria, Nova Hollandia, ad Swan River.

Var. *B.* elytris interstitiis granulis magnis obsitis; intersticiis alternis tuberculatis.

This species bears a very strong resemblance to the *A. morosus*,

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but may at once be known by the two large acutely conical tubercles which are situated on the elytra, at the part at which they are somewhat suddenly deflexed behind. The granules on the thorax are larger, and there are some small conical tubercles on this part; viz. two near the middle of the posterior margin, another at the posterior angle, and one again on the side of the thorax, rather in front of the middle. I do not anticipate these will be constant in all specimens of the species. On the elytra the minute tubercles, commonly distinguished by the term granules, gradually increase in size, so as at last to assume the form of small pointed tubercles, and these latter are most distinct towards the hinder part of the elytra, on the alternate interstices: again, in the region of the shoulders, are some of the small tubercles. The abdomen has some very fine scattered punctures, and some, equally scattered, scales beneath.

I have a specimen of this insect from Swan River, and there are two specimens evidently of the same species in the Collection of the British Museum, but which differ from each other and from the specimen described in certain particulars; one forms the variety *B.*, already noticed, and the other has the two tubercles situated towards the apex of the elytra, and belonging to the second interstice, very little more developed than the tubercles which precede them.

I have named this species in honour of the accomplished President of the Entomological Society of Stettin.

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XII. *Descriptions of Four New Species of Beetles, belonging to the Family* Paussidæ. *By* J. O. Westwood, F.L.S., &c.

[Read 3rd July, 1854.]

Having recently, by the kindness of Professor Boheman and Herr Dohrn, become acquainted with four new species of *Paussidæ*, I have considered it would be useful to publish their characters, by way of supplement to the article upon that family contained in the 2nd volume of the New Series of our Transactions (p. 84), the number of species described in the family now extending to 89. Three of the species are natives of Caffraria, whence they were brought by Wahlberg, and are now contained in the Royal Museum of Stockholm; the fourth is a native of Ceylon, collected by Neitner, and is in the collection of Herr Dohrn himself. All the species belong to the genus *Paussus*.

Section A. Prothorax quasi bipartitus.

Sub-section *b*. Antennarum clava postice excavata.

Divis.* Species Asiatica.

Sp. 48* (*55*). *Paussus pacificus*, Westw. n. s.

P. castaneus, tenue punctatus et vage luteo-setosus, lateribus pronoti postice elytrorumque disco late nigris nitidis, femoribus obscuris, capite inter oculos tuberculo depresso semicirculari instructo, antennarum clava subovata, margine antico subrecto acuto, disco utrinque ad basin longitudinaliter impresso, margine postico excavato, pagina superiori excavationis recta, inferiori denticulis minutis 6 striolisque totidem transversis notata; prothorace sub-bipartito, parte antica capite paullo latiori elevata, in medio longitudinaliter parum impressa, lateribus obliquis et obtusis, medio pronoti fossula transversa brevi impresso; parte postica, ejusdem latitudinis lateribus integris, sensim angustatis; elytris prothorace multo latioribus, punctis minutissimis vix impressis, lateribus setis rubris curvatis brevibus marginatis, nigris, nitidis, basi, lateribus apiceque castaneis, podice castaneo, margine elevato nigro; pedibus gracilibus, obscure castaneis, tibiis posticis brevioribus latioribus 3 palporum maxillarium piceorum articulo 2ndo maximo fere circulari, palpis labialibus gracilibus sub-filiformibus fulvis.

Long. corp. lin. 2¾.

Habitat Ceylon. D. Neitner. In Mus. Dohrn.

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Most nearly allied to the Chinese *Paussus Bowringii*, Westw. Proc. Linn. Soc. June 19, 1849, but at once distinguished by the spineless lateral margin of the fore part of the prothorax, the broad posterior tibia, &c.

Division ** Species Africanæ.

Sp. 63* (56). *Paussus De Geerii*, Westw., n. s.

P. sub-elongatus, fulvus; elytris tenue punctatissimis, setis luteis brevibus obsitis; capite sat lato, inter oculos tuberculis duobus parvis rotundatis depressis inter se et oculos æque distantibus; antennarum clava oblonga curvata, margine antico acuto, apice rotundato, margine postico canaliculato, canali elongato subpyriformi, pagina superiori tuberculis 5 parvis rotundis instructo, posteriori vero parum latiori, inermi; prothorace subbipartito, parte antica capite vix latiori, angulato-elevata, in medio subemarginata, latioribus angulatis; parte postica angustiori, lateribus rectis parallelis elevatis, canali transverso submedio parum profundo, tuberculis duobus contiguis mediis postice terminato; elytris prothorace multo latioribus subparallelis; pedibus elongatis gracilibus; palpis maxillaribus crassis, articulo 2ndo maximo obconico, labialibus articulo ultimo elongato-ovali, dente medio menti fere obsoleto.

Long. corp. lin. $3\frac{1}{3}$.

Habitat in Caffraria. D. Wahlberg. In Mus. Reg. Holm.

In the curved clava of its antennæ as well as in general appearance this species approaches *P. Germari* and *Schaumii*, Westw. Trans. Ent. Soc. N. S. ii. p. 94.

Sp. 63** (57). *Paussus Afzelii*, Westw. n. s.

P. fulvus, vix nitidus, tenuissime scaber; elytris nigris, basi sutura apiceque fulvis, luteo-setosis; capite antice oblique declivi, parte postica capitis semicirculariter et abrupte depressa; antennarum clava oblonga curvata subcultrata, margine antico acuto, apice rotundato, margine postico canaliculato, canali elongato angusto, pagina ejus superiori tuberculis sex minutis impressionibus totidem transversis conjunctis, pagina inferiori parum sinuata integra; prothorace capite parum angustiori subbipartito, parte antica longiori, lateribus rotundatis, in medio supra canali longitudinali fortiter impresso, medio disci fossula trigona impresso, antice utrinque tuberculo parvo rotundato instructo, parte postica

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sensim latiori, lateribus obliquis; elytris prothorace multo latioribus, lateribus subparallelis; pedibus angustis compressis; corpore infra obscurius fulvo; palpis maxillaribus articulo 2ndo magno ovato, labialibus articulo ultimo ovali apice subacuto.

Long. corp. lin. 3.

Habitat in Caffraria. D. Wahlberg. In Mus. Reg. Holm.

This species is closely allied to the preceding, but is well distinguished by the narrow prothorax divided into two nearly equal parts, the anterior with the sides rounded, and the hinder part widest behind.

Sp. 66* (58). *Paussus Bohemani*, Westw., n. s.

P. fulvo-castaneus, nitidus, setis longis erectis obsitus, abdomine obscuriori; capite subgloboso, cornu valido erecto verticali, clava antennarum ovali, glabra, basi supra apiceque in spinam reflexam acutam productis, margine postico canali tenui abbreviato utrinque lobis 5 rotundatis marginato; palpis longioribus, maxillarum articulo secundo subsecuriformi; dente medio menti obliterato; prothorace subbipartito; parte antica antice capitis latitudine, subito elevata, angulis anticis subacutis et paullo porrectis, marginibus lateralibus in medio angulatis, apice anguli obtuso, disco e medio ad basin profunde impresso; parte postica latiori, breviori, angulis anticis angulato-porrectis, tuberculoque elevato oblongo supra rotundato sublaterali utrinque instructa; elytris parte postica pronoti parum latioribus, sensim paullo latioribus; pedibus elongatis, femoribus omnibus in medio clavatis setosis, tibiis curvatis, pone medium præsertim in pedibus intermediis crassioribus, his intus setosis, calcari minimo acuto; tarsis articulo basali minuto.

Long. corp. lin. 3.

Habitat in Caffraria. D. Wahlberg. In Mus. Reg. Holm.

This species is at once distinguished from every other in the genus by the clavate femora and denticulated prothorax. Its general habit is also quite peculiar.

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XIII. *On some of the Difficulties of Entomological Students, as exemplified by recent Experience in the Genus* Elachista. *By* H. T. Stainton, Esq.

[Read 2nd October, 1854.]

A very useful paper by M. Godet appeared in the first volume of the "Annales de la Société Entomologique de France," p. 34, entitled "Quelques Observations sur la Manière de travailler en Histoire Naturelle, et en particulier sur les Monographies." The object of this was, as its title implies, to point out the best way to proceed in working out groups monographically; and this paper may be read with real advantage by *students* at the present day, and none can read it without pleasure.

M. Godet says at page 39, "Pour faire une bonne *Monographie*, il faut avoir une connaissance exacte de l'anatomie du groupe d'insectes dont on s'occupe, faire l'histoire de leurs transformations, de leurs mœurs, de leurs habitudes, des substances végétales ou animales dont ils aiment à se nourrir. Il faut lire les ouvrages de tous les auteurs qui se sont occupés du groupe qui fait l'objet des travaux du monographe. A cette partie se rattache la *synonymie*, si souvent négligée et si eminemment nécessaire. . . . . Ce n'est qu'après s'être enrichi d'une masse d'observations faites par d'autres ou par lui-même que le monographe doit procéder serieusement à la fixation définitive des espèces, à l'énoncé de leurs caractères, à leur description et à l'établissement des groupes artificiels ou naturels."

How true all this is, all who have worked monographically must have felt, and must have found it no light task they had undertaken.

To chronicle observations made, to describe specimens placed before one, is one thing; but to define the limits of the variations of species, to make the observations necessary to supply some gap that is perceptible, are very different matters, and the monographer has this to do, or he fails of his intended end. Passing over the "connaissance exacte de l'anatomie du groupe," I wish to offer a few remarks on the second point, "faire l'histoire de leurs transformations." To do this, it is necessary to know, 1°. Where the egg is laid; 2°. How soon it is hatched; 3°. How long the larva lives before changing its skin; 4°. What change (if any) in the form and markings of the larva takes place when it changes its skin; 5°. At what period the larva will be full fed; 6°. What

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change takes place in its appearance when full fed; 7°. Where it changes to pupa; 8°. What amount of cocoon it makes; 9°. What is the form of the pupa; and 10°. How long it remains in the pupa state.

But besides "l'histoire de leurs transformations," we require that of "leurs mœurs, leurs habitudes." 1°. Is the larva gregarious or solitary? 2°. Is it active or sluggish? 3°. Does it feed by night or by day? 4°. Does it construct any cell or gallery in which it feeds? 5°. Is the pupa lively or not? 6°. Does the perfect insect fly willingly? 7°. What are its motions in flying and walking? Neither does this by any means exhaust the subject; for "il faut faire l'histoire des substances végétales ou animales dont ils aiment à se nourrir." 1°. What is the food-plant of the larva? 2°. On what other plant is it sometimes found? 3°. What other plants will it eat when in captivity and its natural food cannot be supplied?

Now, to answer all these questions with reference to any one species is no easy matter, but to answer them with respect to a whole group requires a vast amount of methodized, systematic observation; for we must notice not only what we do see, but what we do not see. To ascertain that a species is not double-brooded, we must seek for the second brood, and notice that we *do not* find it. All this requires time, patience and perseverance.

Now, to apply the foregoing remarks to the genus *Elachista*, belonging to the *Tineina* division of *Lepidoptera*. Of this genus the larvæ were entirely unknown to us till the spring of 1853, when it was discovered that they mined the leaves of grasses,—a very natural habitat certainly now that we know it, but one which our inductive powers failed to point out to us till accident led to its discovery. Then various grasses were searched with great diligence, and with the exception of the flat-stemmed grass (*Dactylis glomerata*), which was soon found to produce more than one species of *Elachista*, it was assumed that each different grass was the pabulum of a different species of larva; consequently at the close of the season of 1853 it was received as a settled point that certain grasses were the food-plants of certain species of *Elachistæ*.

In a science of observation we first observe an occurrence; we then deduce from that observation certain probable events, which we expect will come to pass, and proceed to repeat our observations to see if it is so. Thus the present season became the touchstone for the discoveries of last year among the *Elachistæ*. The result has been that much that had been considered settled

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has become unsettled, and that there is less confidence in the stability of the new discoveries.

Thus it is found that several of the larvæ (and may not this observation extend to all) are at first very different in form and markings from what they afterwards become; so that from a figure and description of the young larva, the adult larva of the same species would never be recognized.

It is also found that larvæ, supposed to be exclusively attached to individual grasses, feed indifferently on various other species of the *Gramineæ;* hence several different species of larvæ sometimes feed in the same grass; and, further, it is found that it is not the *Gramineæ* only that the larvæ of this genus frequent, but many species are attached to the *Cyperaceæ*.

But to perplex us still further, a species which no one had suspected of any difference of habit, *Elachista Treitschkiella*, has in the larva state so peculiar a mode of feeding and living, that to retain it along with the graminivorous species exceeds all our notions of generic propriety.

This larva was first noticed two years ago mining at the end of summer in the leaves of the dogwood (*Cornus sanguinea*), and making large blotches. Its appearance, however, was so little that of a Lepidopterous larva, that we felt much disposed to regard it as "only some beetle larva," till accidentally observing one in the act of cutting out its case, we were led to examine a little more closely, and we found that in all the empty mines there was a small elliptical hole cut out of the leaf at one end of the mine. Plainly, then, it was the rule for these larva, after ceasing to mine, to use a piece of the leaf wherewith to construct a case. This case is formed of two oval pieces, one being cut from the under, the other from the upper side of the mined place, exactly opposite to each other. The larva lines them with silk, and fastens them together securely at the sides, leaving only a small opening in front and behind. The case is then detached, and descends to the ground, and it was anticipated the larva would there have continued to feed like the larvæ of *Incurvaria muscalella* and *pectinea*. (Hence I have mentioned this larva in my 'Entomologist's Companion," second edition, p. 53, under the genus *Incurvaria*.) However, as far as we have observed, the larva does not feed at all after quitting the leaf, but remains quietly in its case, and does not change to a pupa till the following spring.

Of the larvæ collected in 1852, only one attained the pupa state, and that never came out as imago. Of the larvæ collected last

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year, several have now been bred by Mr. Boyd (who exhibited a specimen at the June Meeting of the Society), by Mr. Douglas and by myself; and the imago proves to be *Elachista Treitschkiella*, of which a figure and description appeared in the concluding number of Fischer von Röslerstamm's excellent work (Pl. 100, fig. 4, p. 297). The position of the insect when at rest is rather different from that of other *Elachistæ*. The wings meet at a more acute angle over the back, as in the genus *Tinagma*, which in the "Insecta Britannica," p. 179, I have on that account compared to *Cilix spinula*.

Elachista Treitschkiella was so rare in our Collections, that at the time of writing the Insecta Britannica I had only seen two old specimens, in Mr. H. Doubleday's Collection; two others were subsequently discovered in the late Mr. Stephens's Collection, when the British *Tineina* of the British Museum were being re-arranged.

It seems strange now that the transformations of an insect, which in its larva state, from its extreme peculiarity of habit, is so very noticeable, should have so long remained unknown, not only here, but on the Continent,* where the perfect insect had been observed swarming round the Cornus bushes; but it is even still stranger that a larva, with a precisely similar habit, should have been observed and described upwards of a hundred years ago. The original description, which I have not had an opportunity of seeing, occurs in the "Mémoires de Mathématique et de Physique, présentés à l'Académie Royale des Sciences, par divers Savans," tom. i. p. 177 (4to. à Paris, 1750); it is referred to by De Geer, tom. i. p. 449, and by Goeze, in the "Naturforscher," Stuck iv. p. 16; the latter writer repeats the whole of the history of the insect, which appears to have been contained in a letter from Godehen de Riville, Commander of Malta, to Reaumur. As it is this reflected light only that has reached me, we see the use of such transcripts; and as the "Naturforscher" is not always accessible, nor is it to all intelligible, I hesitate not to swell the bulk of this paper by transcribing a large portion of the notice.

"I now relate to you the history of a larva mining the vine leaves, which probably you do not meet with in the neighbourhood you explore, as you have not mentioned it in your notes. This deserves a special place in the history of these insects, because it belongs to none of the seven classes into which you have divided the larvæ known to you. On the 25th July I went into

* The larva had been observed by Herr Boie (Ent. Ztg., 1846, p. 292) on *Cornus stricta*, but he did not rear it, and was not aware to what order it belonged.

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the garden of a friend, and, as I was walking among the vines which surround the house, I found, to my great delight, that a certain insect had mined these leaves, at first in slender galleries, but afterwards in great blotches. But the most singular thing was that the mined place, at the side where the insect had last inhabited, had an elliptical hole of moderate size. The two skins of the leaf appeared to have been cut away, as though by a knife. I immediately thought this must be the work of a larva, which has formed its cocoon with the two pieces of the skin of the leaf, and has afterwards removed from its first place of abode — a suspicion which I soon confirmed, since, when I looked at the leaves from below, I soon perceived on them, as also on the stems, several oval cocoons, which were nearly the size of the previously observed holes in the leaves.

"The way in which these cocoons are suspended deserves to be noticed; they hang merely by one end, and always with the disc perpendicular to the object to which they are attached. I contented myself for the present with collecting about thirty of these cocoons; from many had the perfect insects already escaped. In one I found a pupa; it was amber yellow, the six feet (of the perfect insect) were already distinctly visible. The wing cases were here not protruded in front as in other pupæ, but are as long as the body, and lie on it almost like the wings of birds, in such a way that the two ends of the body and the wing cases form, at the hinder end of the pupa, a very perceptible angle. I examined several more of these cocoons, in order to convince myself fully of what I had seen, and afterwards replaced the pupæ in their cocoons, which I had opened at the side, in order that they might not be too much injured. Among four that I examined, two had lost their yellow colour and become black and white, which led me to think that the perfect insects would soon be out. Accordingly, on the following morning two had already appeared, the remainder came out gradually from day to day, and after nine days I had bred eighteen moths from my thirty cocoons. After examining them with the glass, they appeared to me to belong to the third class of moths, which carry their wings like the wings of birds, but have behind a higher margin on them, which forms, as it were, a cock's tail. They are beautiful creatures, of which the feet, head and body are, as it were, silvered. The ground colour of the wings is a beautiful black; each is adorned with four triangular silver spots, of which two are on the inner margin, two on the costa.

"One may easily imagine I was not content with this discovery.

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I was extremely anxious to see the work of the larvæ, how they make their cocoons, and bring them to the place where they wish to hang them; with this view I collected from the garden many vine leaves, placed them with the stems in glasses of water, and put them so against the light that I could with ease observe the movements of the larvæ; and, since I had a supply of them, I wished also to observe the larva itself, in order to see to which class it belonged. I ripped up, therefore, the upper skin which covered them, and brought three or four to light; but what was my astonishment when I examined them one after another, and found neither legs nor prolegs. An apod larva, thought I; an unknown monstrosity. The suspicion therefore came across me: there may be two sorts of larvæ in the leaves, and I have probably stumbled upon some dipterous mining larvæ. I waited therefore for a convenient opportunity to solve my doubts; two larvæ were some hours afterwards about to make their cocoons, and I was an attentive spectator of their work; each drew off his from the leaf, and, after wandering about for a time, made a stop under a nerve of a leaf, and hung up its cocoon. This happened in about three-quarters of an hour. Since I knew for certain that larvæ were within, I cut them open, and by this learnt that the previous insects I had were truly apod Lepidopterous larvæ, since these were exactly like them. I examined them with a lens of two lines focus, but could discover no feet, twist and turn them as I would; not being satisfied, I placed them under a powerful microscope, but could not observe feet on any of the segments."

Here I cease my extract, but those who feel curious will find several pages more in the original; and I should here mention that no feet are perceptible in the larvæ of *Elachista Treitschkiella!* The larva of the vine leaves is certainly congeneric with that of the dogwood, but, not passing the winter in the larva state, is easier to breed. The perfect insect is at the present day entirely unknown to us; but surely it can be no difficult matter for Entomologists who reside in wine-growing countries to re-discover this interesting species, for which I beg to suggest the name of *Elachista? Riwillei*, in honour of its discoverer, whose observations would be creditable in any Entomologist at the present day, whilst the reflection that they were *published in* 1750 may well overwhelm us with astonishment.

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XIV. *Description of a new Genus of Coleopterous Insects inhabiting the Interior of Ants' Nests, in Brazil.* By J. O. Westwood, F. L. S., &c.

[Read 7th August, 1854.]

The recent discovery of numerous remarkable species of Coleopterous insects in the interior of ants' nests, amongst the former of which are to be included many species of the family *Paussidæ*, and the not less singular discovery of several most anomalous species of *Staphylinidæ* in the nests of white ants, in Brazil, have induced our indefatigable correspondent in Brazil, Mr. W. H. Bates, to search the nests of these different insects, in the hopes of meeting with new species of *Paussidæ*, or other equally curious insects in such situations; nor has his search been entirely fruitless, since, although he has not detected any member of the family *Paussidæ* (one of which had, however, been found on the Corcavado mountain, near Rio Janeiro, by Mr. Miers), he has been fortunate enough to capture several specimens of a small Coleopterous insect, of an entirely new type, whose situation in the order is very uncertain, and whose structure is, in many respects, as remarkable as that of any known insect of the Coleopterous order.

Having been allowed to examine these interesting insects in detail, I am enabled to lay before the Society figures and descriptions of all those important organs, upon the variations of which the distribution of the order *Coleoptera* has been established; especially the structure of the antennæ, trophi, tarsi, veining of the wings, and the number of the segments of the abdomen.

It is especially worthy of notice, that, whilst many of the species of beetles found in ants' nests are destitute of organs of sight, the eyes exist in the insect under consideration, of the ordinary size and structure.

The following are the characters of the genus which I propose for the reception of the insect in question.

Gnostus, Westw.

Corpus minutum convexum, rigidum, politum, capite parvo, elytris magnis oblongis, postice rotundatis, abdomen omnino tegentibus. *Caput* minutum, in cavitate antica prothoracis fere ad oculos immersum, antice rotundato-subporrectum, pone oculos utrinque profunde et oblique impressum. *Oculi*

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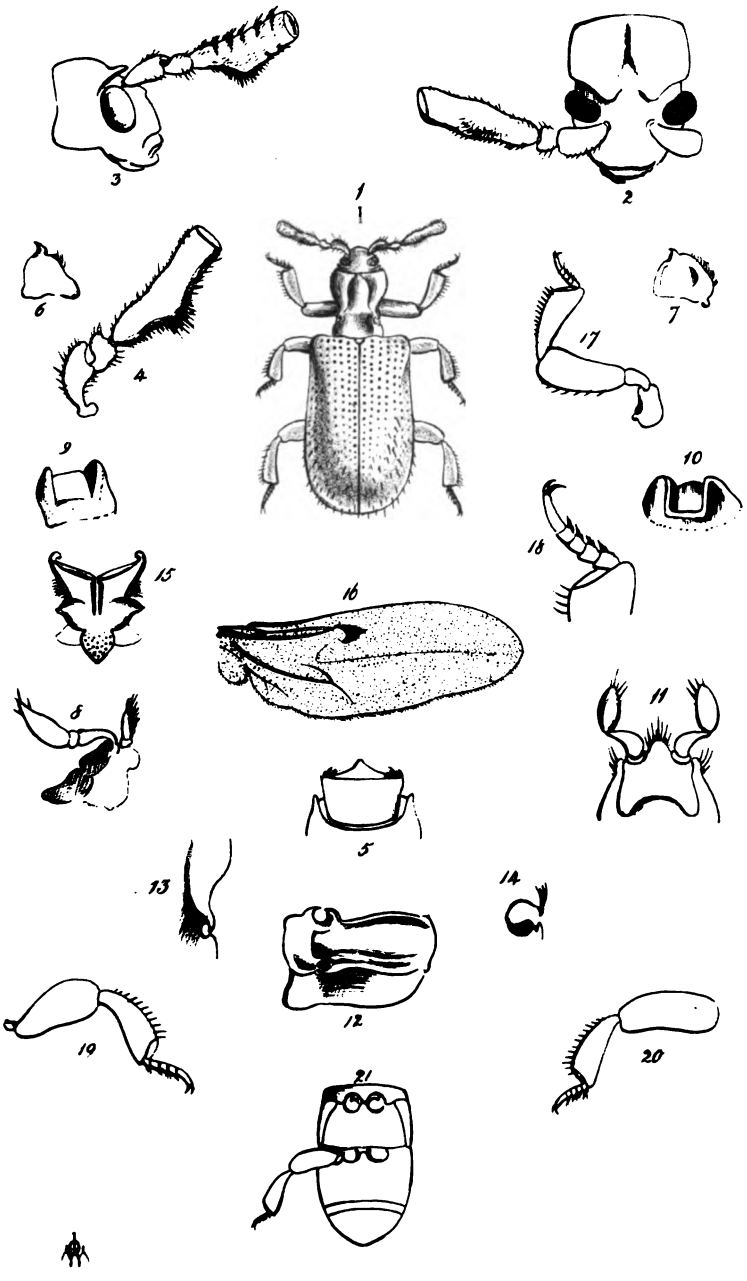

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sat magni laterales transverso-ovales. *Antennæ* paullo ante angulos internos oculorum insertæ, pronoto breviores subcylindricæ; articulo 1mo subclavato, curvato, apice oblique truncato, articulo 2ndo in angulum inferum truncaturæ apicalis articuli basalis inserto, basi gracili supra in angulum subacutum producto, articulo 3tio elongato, cylindrico apice truncato, subtus fere ad medium in angulum obtusum producto; hoc articulo, certo situ, quasi ex articulis sex arctissime conjunctis apparenti. *Os* minutum, instrumentis cibariis haud porrectis. *Labrum* parvum, transversum, antice angulato-productum. *Mandibulæ* parvæ, corneæ, subtrigonæ, dente minuto acuto apicali armatæ. *Maxillæ* minutæ, basi extus corneo, lobo unico apicali gracili intus setoso instructæ; lobo ad basin quasi articulato. *Palpi* maxillares, ut videtur, tantum 3-articulati (articulo ordinario basali forsan obliterato vel subobsoleto): articulo 1mo basi curvato, apice parum crassiori; articulo 2ndo brevissimo annuliformi; 3tio majori, in medio parum ovali-inflato, apice acuto, setis nonnullis brevibus instructo. *Mentum* corneum, transverso-quadratum, angulis anticis lateralibus parum porrectis et obtusis, spatio intermedio valde depresso. *Labium* transversum, in medio inter palpos subconice productum et setosum. *Palpi* labiales minuti, 3-articulati; articulo 1mo minimo annuliformi, 2ndo curvato sensim attenuato, 3tio ovali, apice subacuto, setisque nonnullis instructo. *Prothorax* oblongus, quasi in duas partes valde inæquales (postica multo minori) impressione divisus, pars antica capite multo latior; fossulis duobus paullo curvatis, longitudinalibus in discum notatus, lateribus rotundatis, in parte constricta utrinque in hamos duos apicibus acutis fere conjunctis productis; parte postica transversa fere anticæ latitudine æquali. *Scutellum* parte detecta parva subcordata punctata. *Elytra* magna, pronoto fere duplo latiora, antice subtruncata, angulis humeralibus fere rectis, lateribus subparallelis, apice rotundatis; convexa, glabra, parum setosa, punctato-striata, punctis ante apicem desinentibus, callo nullo subapicali. *Alæ* magnæ, punctis minimis obsitæ, margine ciliato: venis duabus subcostalibus ante medium alæ in stigma mediocre submarginale desinentibus; vena altera infera ante marginem posticum recurva, venula ad marginem emittente alteraque furcata fere obsoleta subanali, dimidio apicali alarum venis destituto. *Pedes* breves, femoribus subclavatis, tibiis compressis parum curvatis, externe breviter serratis, apice suboblique truncatis; tarsis brevibus, omnibus

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simplicibus, 5-articulatis, articulo 5to paullo longiori et graciliori: unguibus simplicibus. *Mesosternum* brevissimum, metasternum transversum, coxis posticis parvis subrotundatis. *Abdomen*, ut videtur, 3-articulatum, segmento 1mo maximo, 2ndo brevissimo, 3tio mediocri subtriangulari.

Species unica. *Gnostus formicicola*, Westw. (Pl. VIII. fig. 1.)

G. omnino rufo-castaneus, nitidus, corpore et pronoto glabris; elytris punctato-striatis, corpore infra polito impunctato convexo.

Long corp. lin. 1,=$\frac{1}{12}$ unc.

Habitat in Brasilia, apud Santarem, in nidis *Myrmicæ* (*Crematogastris*) *victimæ*, Smith. D. Bates. In Mus. Britann., &c.

Mr. Bates, supposing the insect (from its antennæ) to belong to the *Paussidæ*, thus mentions the capture of this parasite,

"No 140. *Myrmicæ* (*Crematogaster*), neuter and fem., with its formicarium formed in hollow, dried suspended sipós. Only one female in each formicarium. This ant has a small species of *Paussidæ* almost invariably in its company, one, or at most two, in each colony. No *Paussus* was found in any part of the sipó not inhabited by the *Myrmica*."

In our present dearth of knowledge upon the point we can only speculate upon the object of the residence of this and numerous other small *Coleoptera* in the nests of ants. That it is not without the concurrence of the latter seems evident, not only from the facility with which a colony of ants would dislodge the intruders, but also from the fact that the ants have actually been seen carrying some of these species of beetles—as, for instance, a species of *Paussus*—in their jaws. Whether, like the *Aphides*, these beetles emit peculiar secretions, to which the ants are partial, I am unable to state; but certainly many of the ant-nest beetles are provided with small bundles of curved rigid setæ on various parts of their bodies, of which the uses are unknown, such as the tufts on the heads of the *Claviger*, and on the pronotum of the *Paussidæ*, and in the *Gnostus*, on the under side of the middle of the third joint of the antennæ. Whether, also, on the other hand, these beetles feed either on the eggs, larvæ or pupæ of the ants, or upon their stores of food, is also conjectural.

Mr. Bates, it will be seen, considers the insect above described to belong to the *Paussidæ*; but, except in the paucity of joints in the antennæ, the constricted prothorax, and the short legs with five-jointed tarsi, no actual relation can be traced with that family;

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the structure of the mouth and wings, and the large convex elytra entirely covering the abdomen (closely resembling the genus *Lema* in this respect), entirely removing it from *Paussi*. With *Claviger*, also (to which it bears some slight relation in the structure of its few-jointed antennæ, truncated at the tip), it possesses still less affinity. Its nearest allies, on the other hand, appear to me to be found amongst some of those *Xylophaga* of Latreille which possess five-jointed tarsi, but with none of these groups does it bear a very close relationship, even if we regard the antennæ as an anomalous aberration.* *Ditoma*, *Colobicus*, *Synchita*, *Cicones*, *Aulonium*, *Colydium*, *Teredus*, and one or two allied genera, are at once separated from it by their four-jointed tarsi, and by the leathery patch on the lower margin of the wing beyond the middle, and by the veinless apical portion scarcely occupying more than one-third of the length of the wing. *Cerylon*, also, in its four-jointed tarsi and subulate palpi, is removed from *Gnostus*. *Anommatus*, also, which has a glossy castaneo-rufous body, and is a terrestrial insect, has bilobed maxillæ, four-jointed tarsi, &c. Some of the *Cucujidæ* have, it is true, five-jointed tarsi, and the apical veinless portion of the wing is of very great extent, but their maxillæ are bilobed, and the palpi of ordinary form. With *Latridius* and *Holoparomecus*, as well as with the minute insects belonging to the *Corylophidæ*,† there appears to be some slight relation in the comparative want of development of the maxillary appendages, but the struc-

* In addition to the great number of species of *Brachelytra* found in ants' nests, the following genera of the *Xylophaga* of Latreille have also been found to possess Formicicolous habits:—

Cholovocera formicaria, Motschoulsky, Bull. Mosc. 1838, 177; Markel, Zeitsch. für Ent. v. 255.

Latridius formicetorum and *fusculus*, Mannerheim, Bull. Mosc. 1843.

Latridius elongatus, Markel, Zeitsch. für Ent. v. 253.

Hypocoprus formicetorum, Motschoulsky, Bull. Mosc. 1839, 72.

Cryptophagus glaber, Gyllenhal, Markel, Zeitsch. für Ent. iii. 218.

Cryptophagus (4 species), Markel, Zeitsch. für Ent. v. 244.

Trichopteryx (1 species), Markel, id.

Corticaria (4 species), Markel, id. 252.

Synchita Juglandis, Markel, l. c.

Cerylon (2 species), Markel, l. c.

Rhizophagus (2 species), Markel, l. c.

Monotoma angusticolle and *conicolle*, Aubé, Ann. Soc. Ent. France, vi.

Myrmechixenus subterraneus, Chevrolat, Rev. Silberm. iii. 263, and Markel, o. c. v. 253. As well as

Scydmænus (9 species), Markel, o. c. v. 242; and several species of minute *Histeridæ*.

† Details of several of these genera will be found in the lower part of the 10th plate in Mr. Wollaston's Insecta Maderensia.

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ture of the tarsi, antennæ, &c. remove them from the genus above described. From the preceding details it will, I think, be evident, that, whilst *Gnostus* is most nearly allied to such of the *Xylophaga* of Latreille as possess five-jointed tarsi, it stands sufficiently detached from the whole of them as to constitute a distinct sub-family of its own.

EXPLANATION OF PLATE VIII.

Fig. 1. *Gnostus formicicola*, greatly magnified.
Fig. 2. Head seen from above.
Fig. 3. Head seen sideways.
Fig. 4. Antenna seen from behind.
Fig. 5. Labrum.
Figs. 6, 7. Mandibles.
Fig. 8. Maxilla.
Figs. 9, 10. Mentum in different points of view.
Fig. 11. Labium and labial palpi.
Fig. 12. Prothorax seen obliquely from the side.
Figs. 13, 14. The lateral hooked portion in different points of view.
Fig. 15. Scutellum.
Fig. 16. Wing.
Fig. 17. Fore leg.
Fig. 18. Fore tarsus.
Fig. 19. Middle leg.
Fig. 20. Hind leg.
Fig. 21. Meso and metathorax, abdomen and hind leg, from beneath.

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XV. *Essay on the Genera and Species of British Formicidæ.* By Frederick Smith, Esq.

[Read December 4th, 1854.]

In offering the present Essay to the notice of the Entomological Society, I beg that it may be considered as an attempt to form a correct census of the number of indigenous species of Ants; this family of insects has hitherto obtained so small a share of indefatigable research, that it will be evident, the present list must not be considered as one which approaches a complete Fauna, but which embodies descriptions merely of all the present known species inhabiting Great Britain. Every care has been bestowed upon their identification with the species described by Nylander, Foerster, and others; and, in most instances, aided by a comparison with typical specimens presented by those eminent Entomologists to the author: possessing these valuable and most efficient aids, I present the following Essay with a greater degree of confidence than I otherwise could have assumed.

Tribe HETEROGYNA.

Family FORMICIDÆ.

The *Formicidæ*, or Ants, is composed of a large group of insects, probably exceeding in the number of its species that of any family of *Hymenoptera:* the *Ichneumonidæ* alone, in my opinion, may probably equal it. It is true that the known British species are few in number, for the metropolis of these insects lays in the tropics, from whence they appear to diverge, gradually becoming less numerous as they approach the frigid regions of the arctic circle. The number of species which inhabit the New World, if we may form a calculation from the observations of an intelligent and indefatigable Naturalist, Mr. W. H. Bates, must, as he justly observes, "exceed all that can be reasonably imagined;" for he continues, "I think it will reach the number of 400 species in the the Valley of the Amazons alone; there appears to be a distinct species of *Myrmica* in every twig and stem in the woods." If such be the case in so limited a district, what must be the number when those which inhabit the vast lands of Africa, India, Southern Europe, and the remaining portions, South and North America,

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become known? how few of the species which inhabit the Continent of Australia are yet known to us—what knowledge have we of those of Madagascar and the adjacent islands? New Zealand must also be rich in species belonging to this tribe.

It is, however, our province in this Essay to describe the species which inhabit the United Kingdom of Great Britain, and we have only glanced at those which inhabit other countries, in order to establish our position, of the important part which these insects must perform; and consequently, how beneficial must be results of their economy, in the great scheme of beneficence which caused "the earth to bring forth the living creature after his kind," "and every thing that creepeth upon the earth after his kind," "and behold it was very good."

These interesting insects have at all times attracted the attention of man, and from the remotest periods have served, by their industry and untiring perseverance, to inculcate lessons of the highest moral tendency. The proverb of Solomon is engraven upon the minds of our children from their earliest years; and although the Ants of northern latitudes do not provide their meat in the summer, and gather their food in the harvest, in the general acceptation of this proverb, still such may be the case in other countries. Be that, however, as it may, the words of the great Hierophant inculcate the necessity of using our unceasing endeavours to perform with industry the duties assigned to us, in whatever station of life Providence has placed us.

On the Continent, the Ants have had their monographer in the illustrious Latreille; the "Histoire Naturelle des Fourmis," is the text book of Hymenopterists. Since the publication of this work in 1802, no important work on the Ants of Europe appeared until the publication of Dr. Nylander's Monograph on the Ants of Northern Europe: this work will be acknowledged universally as being the most complete and accurate on the European *Formicidæ*.

In addition, we must also record the labours of Foerster on the *Formicariæ*, and also of Mayr of Vienna; the works of these Entomologists contain descriptions of nearly all the known species of Europe. Mr. Curtis has recently added some species unknown to the authors I have named. Our own countryman, Gould, in 1747, published a valuable treatise on these insects: he describes five species of British Ants; these were all with which he was acquainted, one belongs to the genus *Myrmica*. The great value of this work is the accuracy with which their habits are described; as a proof of which may be mentioned, that Gould particularly

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distinguishes the difference in their metamorphosis. Of the red Ants he says, "they do not, like the rest, infold themselves in a tissue or shell;" he also notices "two sizes of workers, and that the red Ants are furnished with a sting; these observations were made previous to the publication of the "Fauna Suecica" of Linnæus.

Of the number of species which inhabit Great Britain, we are, I believe, at present ignorant. The publication of Nylander's work has directed our attention more particularly to this point, and several new species have been discovered, but when the remote and Alpine districts of Scotland shall have been well explored, doubtless many others will be found; I am acquainted with twenty, whilst only thirteen of those given in the Systematic Catalogue by Stephens are indigenous and distinct. My observations on the habits of Ants would add little to what has already been made known by Gould, Huber and others; indeed, so much has been done by the naturalists named, that it will only be necessary, in some points, to add my testimony to the accuracy of the more remarkable peculiarities in their economy, as detailed in the works of the authors alluded to.

As a general rule, we may observe, that it is only the species of the genus *Formica* which in the pupa state are enclosed in a cocoon spun by the larva; those belonging to the genus *Myrmica* do not spin a cocoon. It is a trite remark, that every rule has its exception, and such is the case with these genera. I have occasionally observed, during the months of July and August, pupæ of *Formica fusca* not enclosed in cocoons, and such pupæ in various stages of maturity; I have also observed the same of the pupæ of *F. fuliginosa*, great numbers of which I found in channels constructed under the bark of a decaying birch tree.

The closest observation has not enabled me to trace the larvæ of Ants continuing in that form, "about a year and a quarter," as stated by Gould; indeed, I have never been able to find any larvæ in the nests of *F. rufa*, or *F. fusca*, after the end of autumn; but as regards colonies of *F. flava* and *F. nigra*, larvæ will frequently be found in the depth of winter: these are carried by the workers into the deepest chambers of their dwellings; and it is a remarkable circumstance, that the larvæ of *F. flava*, which pass the winter in that state, are densely covered with pubescence; I have also found numbers of a dark-coloured *Aphis* in chambers apart from the torpid larvæ of the Ants, in the depth of winter. Much attention has been paid to the subject of insects found in Ants' nests, many of those enumerated being merely casual or

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accidental visitors; but that many are in some way highly necessary, or highly conducive to some important point in the economy of the *Formicarium*, is, I think, easily proved. In the first place, I would mention the presence of *Aphides* in the nests of *Formica flava:* of these I have observed great numbers in some colonies, they are kept usually apart from the full-grown larvæ and pupæ, and are eagerly carried off by the Ants, when exposed by the removal of a part of the Ant-hill, or, as may be better observed, by the removal of a stone, when the nest is constructed beneath; it was in the latter situation that I first discovered *Claviger foveolata*, in 1844, in considerable numbers in the channels or galleries of the *Formicarium*, the *Claviger* was quickly seized upon by the Ants, and carried down into the subterranean labyrinths.

I have also obtained considerable numbers of insects which are imprisoned by Ants, by watching Ant-hills in the spring, and observing all that is carried to them by the Ants: I have secured numbers of *Myrmedonia canaliculata,—limbata* and *humeralis*, and also of *Lomechusa emarginata;* the latter insect is found sometimes in the nests of *F. fusca*, and *F. rufa*, but it is usually much more abundant in the nests of *Myrmica*. In the nest of a species of the latter genus I found a specimen of *Batrisus formicarius*, in Yorkshire. Many other insects will no doubt be met with in nests of *Formicidæ;* I have only mentioned such as I have seen conveyed there by the Ants themselves, these being doubtless highly beneficial in working out some important phase in their economy; and it has probably occurred to others as well as to myself, that the aliment obtained from these insects may have some stimulating properties, highly conducive to the development of the sexes — but this point requires careful investigation; I would observe, however, as bearing upon this supposition, that I never observed an Ant conveying these insects subsequent to the development of the males and females. There is another insect, which belongs, I believe, to the order *Homoptera—Dorthesia cataphracta*—which is constantly found in most of the nests of the *Formicidæ;* these have frequently been mistaken for the young of *Oniscus*, which they greatly resemble in form, but are of a different colour, being snow-white: whether the presence of these insects is in any way conducive to the development of any portion of their economy, I am not prepared to advance an opinion upon, but I have usually observed them in all the nests of the *Formicidæ*.

The *Formicidæ*, as a group, may be characterized as social

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insects, living in societies, consisting of males, females, and workers—the males and females winged, the latter only temporarily so: the workers being divided into two classes, one consisting of labourers, which are exclusively occupied in the formation of the nests, or in feeding the young brood; the second division consists of soldiers or guards, these not only defend the citadel from the attacks of other insects, but also in some species capture and make slaves of others: the only one which does so in this country being the *Formica sanguinea*, which is very abundant in Hampshire, where I once witnessed an attack upon a nest of *Formica fusca*—workers and pupæ were both carried off by the sanguine Ants. On examining a colony of this species, I found workers of *F. fusca*, *F. flava*, and a few individuals of *Myrmica rubra*, all living in community.

Although the *Formicidæ* have been divided into sections, each composed of societies which follow one habit of economy—as mining-Ants, timber-Ants, mason-Ants, &c.—still each species is constantly found under different phases of habit; the wood-Ant will be found in a decayed tree, or, as I have observed it, in a turf bank: but these deviations are not frequent in this species, which is one of the most constant in habit. The jet-ant, *F. fuliginosa*, is also very constant in forming its habitation in decaying trees, but this also I have found excavating its galleries in a sand-bank; such deviations give us opportunities of extending our admiration of the wonderful ingenuity constantly shown by these insects, in adapting their habits to the circumstances into which accident sometimes throws them.

Genus Formica.

The maxillary palpi 6-jointed; the labial palpi 4-jointed. *Antennæ*, the scape elongate, usually more than two-thirds of the length of the flagellum: the flagellum 12-jointed in the females and workers, 13-jointed in the males; the scape in the male not quite half the length of the flagellum; eyes lateral, ovate; ocelli 3 in a triangle. Males and females winged, constant in the former, temporary in the latter sex; the superior wings having one marginal, one submarginal, and one discoidal cell; eyes of the males large and prominent, genital organs exserted. *Abdomen* composed of 6 segments in the females and workers, and of 7 in the males, the first segment in all the sexes forming a flattened scale: neither of the sexes furnished with a sting.

The pupa enclosed in a silken cocoon spun by the larva.

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Sp. 1. *Formica rufa.*

Fœmina.—Rufo-ferruginea—fronte cum occipite, mesothorace supra, scutello et post-scutello, et abdomine supra castaneo-nigris; clypei medio, palpis, antennis, mesothorace, tibiis, tarsisque fuscescentibus; squama lata subtriangulariter fere rotundata margine supero inequali; alis fusco-hyalinis, apicis subhyalinis.

Operaria.—Testaceo vel rufo-ferruginea nuda, levissime cinereo-micans, fronte cum occipite et abdomine castaneo-fuscis; occipite, antennis, tibiis, tarsisque fuscescentibus; squama, abdominis basi et ano rufo-maculatis.

Mas.—Nigro-fuscus, parum cinereo-nitens, sparse pubescens, pedibus rufescentibus; squama subquadrata humili crassa, supra vix vel parum concaviuscula; valvula ventrali pilosula sæpe rufescente.

Formica rufa, Linn. Faun. Suec., No. 1721; Syst. Nat., i. 962, 3; Scop. Ins. Carn., p. 313, 836; Fabr. Ent. Syst., ii. 351, 8; Syst. Piez., 396, 11; Schrank, Ins. Aust., No. 834; Rossi, Faun. Etrus., ii. 113, 836; Don. Brit. Ins., xiv. 76, tab. 496; Latr. Fourm., p. 143, tab. 5, fig. 28, ♀, ☿, ♂; Jurine, Hym., p. 272; St. Farg. Hym., i. 201, 3; Curtis, Brit. Ent., xvi. tab. 752; Zett. Ins. Lapp., 449, 5; Nyland. Mon. Form. Boreal., p. 902, 5; Foerst. Hym. Stud. Form., p. 13, 3.

Formica dorsata, Panz. Faun. Germ., 54, 1, ♀.

Formica obsoleta, Zett. Ins. Lapp., 449, 5, ☿, ♀.

Formica lugubris, Zett. idem, 449, 6, ♂.

Female.—Length 4½—5 lines. Head as wide as the thorax, fusco-nigro; the sides of the face below the eyes, and the cheeks, rufo-testaceous. Antennæ fuscous, the scape sometimes rufo-fuscous; the mandibles rufo-ferruginous, covered with a short sparing pilosity, the eyes pilose. Thorax rufo-ferruginous, subovate; the disk, scutellum and post-scutellum nigro-fuscous, the scutellum polished; a slightly impressed line on the mesothorax anteriorly, not reaching the middle of the disk, a similar abbreviated line on each side over the insertion of the wings, the latter fusco-hyaline, paler towards their apical margins; the coxæ, trochanters and femora rufo-ferruginous; the tips of the femora, tibiæ and tarsi fusco-ferruginous. Abdomen nigro-fuscous, subglobose, smooth and shining, the scale, base and apex rufo-ferruginous.

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Worker.—Length 3—4 lines. Head and thorax rufo-ferruginous; the vertex, and a broad stripe, passing from the vertex of the eyes to the insertion of the antennæ, nigro-fuscous; an impressed line passes from the anterior stemma to the base of the clypeus; the latter has a fuscous stain in the centre, the antennæ of the same colour, the eyes black. Thorax elongate, compressed; a deep strangulation between the meso and metathorax; the prothorax has a fuscous spot above; the metathorax elevated: the abdominal scale sub-rotundate, slightly notched above; the scale, coxæ, trochanters, and base of the femora, rufo-ferruginous; the femora, tibiæ and tarsi dark rufo-testaceous. Abdomen ovate, nigro-fuscous, covered with an obscure cinereous pilosity, a few scattered pale hairs at the apex; beneath nigro-piceous.

Male.—Length 4—5 lines. Nigro-fuscous; head not so wide as the thorax, eyes large, prominent and oblong-ovate; the head and eyes slightly pilose. Thorax elongate-ovate, the scutellum and metathorax shining; wings as in the female; the femora and knees rufo-testaceous. Abdomen as long as the head and thorax, the margins of the segments polished, the apex rufo-testaceous.

This species is perhaps the most generally known of all our indigenous ants, and has hence acquired several popular appellasions, as the Pismire, the Hill Ant, the Wood Ant, and the Horse Ant; the latter possibly from its habit of carrying burdens of sticks, leaves, &c. in constructing its nest; it is found in all parts of the kingdom, but I have observed its colonies to be larger and most numerous in the north, particularly in open spaces in fir woods; the nest of this Ant is resorted to by the larvæ of several Coleopterous insects for the purpose of undergoing their transformations. I have found the *Cetonia aurata*, and numbers of pupæ and perfect individuals of *Clythra 4-punctata*, in nests which I have met with in Yorkshire.

Sp. 2. *Formica sanguinea.*

Fœmina.—Rufo-ferruginea, levissime cinereo-micans, fronte cum vertice et abdomine castaneo-fuscis; squama subtriangulariter rotundata, margine supero vel integro vel leviter emarginato; alis a basi ad medium pallide rufescentibus.

Operaria.—Capite, thorace pedibusque sanguineis, clypei marginis leviter emarginato; abdomine castaneo-fusco.

Mas.—Fusco-niger, pedibus pallide rufescentibus, clypeo obsolete emarginato; squama crassa, transversim subrectangulari, supra integra, vel late subemarginata.

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Formica sanguinea, Latr. Hist. Nat. Fourm., p. 150, pl. 5, fig. 29, ☿ ; Jurine, Hym., p. 272 ; St. Farg. Hym., i. 203, 4 ; Foerster, Hym. Stud. Form., p. 20, 6, ☿ ; Smith, Cat. Brit. Hym. Append., 115, ♂, ♀, ☿.

Formica dominula, Nyland. Adno. Mon. Form. Boreal. Eur., p. 905, 6, ♂, ♀, ☿.

Female.—Length 4—4¼ lines. Head, thorax, legs and scale of the abdomen of a sanguine red ; the face above the insertion of the antennæ and the vertex obscurely fuscous ; the inferior margin of the clypeus distinctly notched in the middle : the mesothorax having three indistinct fuscous stripes ; the wings have the basal half of a smoky brown, the nervures and stigma fusco-ferruginous. Abdomen slightly red at its extreme base, the apical segment slightly pubescent ; the margins of the segments having a few glittering pale hairs.

Worker.—Length 3—4 lines. Very similar to *F. rufa ;* but the head, thorax and legs are entirely red ; the anterior margin of the clypeus distinctly emarginate ; the scale subtriangular, rounded at its superior margin and slightly emarginate in the middle ; abdomen as in the female.

Male.—Length 4 lines. Resembles that of *F. rufa*. The legs are entirely red ; the flagellum fusco-ferruginous, the extreme base of the scape ferruginous ; the anterior margin of the clypeus slightly notched in the middle ; the mandibles longitudinally rugose, rufo-piceous towards their apex ; the eyes not pilose as in *F. rufa ;* the scale sub-emarginate above, or rather transversely entire, having the lateral angles somewhat raised : wings as in the female ; abdomen as long as the head and thorax, covered with a changeable sericeous pile.

Var. β. ♀. The head and thorax entirely of a blood red.

Var. γ. (☿ major) having the vertex and front fuscous.

The (☿ minor) has the vertex and front, the disk of the prothorax, the coxæ, trochanters and femora, more or less fuscous.

I think there can be no doubt of this species being the *sanguinea* of Latreille. Nylander says that this species as well as his *F. truncicola*, both answer to the description of *sanguinea ;* but we must bear in mind at the same time that a figure of the scale is given, and it is much more like that of the present species than that of the worker of *F. truncicola*, and I think Latreille would not have omitted to mention the pubescence with which the latter insect is covered ; and, above all, Nylander leans to this opinion : I have therefore adopted Latreille's name.

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F. sanguinea occurs plentifully in the fir woods of Hampshire, or rather at their sides. I have always found its colonies in banks, or in stumps of decayed trees. It also occurs at Weybridge. Their societies are not so numerous as those of *F. rufa*; the large workers are very courageous, on disturbing their nest they will seize a finger, and retain their hold until their heads are torn off in removing them; I have found all the sexes in the nest in the month of August.

Sp. 3. *Formica cunicularia.*

Fœmina.—Rufo-ferrugineo, cinereo-micans; palpis, antennarum flagellis abdominisque castaneo-atris; mesothorace maculis tribus longitudinalibus, una antice aliaque laterali utrinque, scutello, post-scutello, mesosterno, tarsis apicis fuscis; squama lata, sub-cordata, vel supra truncata tantum leviter inæquali; alis hyalinis, basi parum fumatis: nervis et stigmate fusco-ferrugineis.

Operaria.—Rufo-ferruginea, cinereo-micans; capite supra, palpis, flagellis et abdomine castaneo-atris; thorace supra et pedibus fuscescentibus; squama supra subtruncata vel leviter emarginata.

Mas.—Ater, cinereo-micans, pedibus rufo-testaceis, coxis basi exceptis; oculis nudis, squama supra late concava, valvula ventrali sparse pilosa, disco fere toto subrotundato plane impressiusculo.

Formica cunicularia, Latr. Hist. Nat. Fourm., p. 151; Huber, Rech. Fourm., tab. 2, fig. 11,'12, 13, ♀, ☿, ♂; St. Farg. Hym., i. 203, 5; Losana, Fourm. Pied., 10; Nyland. Adno. Mon. Form., 913, 11; Foerster, Hym. Stud. Form., p. 25, 9.

Formica stenoptera, Foerster, idem, p. 26, 10.

Female.—Length 4 lines. Resembles *F. sanguinea*; the anterior margin of the clypeus somewhat angulated, convex above and subcarinate in the middle; the clypeus, face on each side, mandibles and base of the flagellum, rufo-ferruginous; the thorax above sometimes entirely fuscous, sometimes having three fuscous stripes; the claw joint of the tarsi fuscous; the extreme base and apex of the abdomen more or less ferruginous.

Worker.—Length 3—3½ lines. Resembles the *F. rufa*, but has the scape of the antennæ more slender and not thickened at the apex, the flagellum is also more slender; the angular shape above the clypeus is opaque, in *F. rufa* it is polished; the face black above

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the insertion of the antennæ, in *F. rufa* it is red on each side as high as the vertex of the eyes: in small individuals, the entire thorax above, the scale above, and the tibiæ and tarsi above, are more or less fuscous; the margins of the segments of the abdomen are sometimes rufo-piceous, the tip of the abdomen pale.

Male.—Very closely resembles *F. fusca*, but differs from it in the form of the scale, which is transverse, its superior margin being emarginate the entire width; the angles of the emargination are oblique, the sides being straight—in *F. fusca* the scale is subrotundate and slightly emarginate above; the antennæ are more slender, the scape longer, and the face less produced before the eyes than in *F. fusca*.

This species may be very correctly called a mining Ant; it constructs its subterranean dwelling, consisting of long tortuous passages, in banks, preferring those in which there is a mixtnre of clay. It is found in the London district, but is much more local than *F. fusca;* I have also found it in the Isle of Wight, at Blackwater, Hants, at Weybridge and Southend; but it is not a very generally distributed species, being confined to particular localities. I have found all the sexes in the *Formicarium* in the month of August.

Sp. 4. *Formica fusca.*

Fœmina.—Fusco-nigra, nitida, cinereo-micans, mandibulis rufescentibus; scapis antennarum pedibusque rufo-testaceis; alis hyalinis, nervis et stigmate fuscis; squama lata subtriangulariter subrotundata; abdomine ovato, sub-nudo.

Operaria.—Nigra, nitida, valde cinereo-micans; mandibulis, antennarum scapis, flagellorum basi et pedibus rufo-piceis; femoribus apice rufo-pallidis; squama triangulariter subrotundata, supra leviter emarginata.

Mas.—Fusco-niger, nitidus, cinereo-micans, antennis et pedibusque pallide rufescentibus; squama subrotundata, margine supra emarginata.

Formica fusca, Linn. Faun. Suec., p. 226, 1722; Syst. Nat., i. 963, 4; Fabr. Ent. Syst., ii. 352, 11; Syst. Piez., p. 399, 13; Latr. Hist. Nat. Fourm., p. 159, t. 6, f. 32, ♂, ♀, ☿; Huber, Rech. Fourm., tab. 2, fig. 8 ♀, 9 ☿, 10 ♂; Jurine, Hym., p. 272; Zett. Ins. Lapp., p. 448, 4; St. Farg. Hym., i. 205, 6; Nyland. Adno. Mon. Form., p. 919, 15; Foerster, Hym. Stud. Form.

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Female.—Length 3½ lines. Fuscous, the head and thorax densely covered with a short fine cinereous pile; the head as wide as the thorax, the scape and base of the flagellum rufo-testaceous; the mandibles fusco-ferruginous; the anterior margin of the clypeus entire: the wings hyaline, the nervures testaceous, the stigma fuscous; legs pale rufo-testaceous, the base and apex of the joints palest. Abdomen ovate, shining and nigro-æneous; sparingly covered with a thin cinereous pile, not visible in long disclosed specimens, the extreme apex ferruginous: the apical margins of the second and third segments narrowly and obscurely rufo-piceous.

Worker.—Length 2—2½ lines. Nigro-fuscous, thinly covered with a fine cinereous pile, the antennæ and mandibles as in the female, the clypeus having in the centre an indistinct longitudinal carina; the thorax of the same form as in *F. rufa;* the scale large, rounded at the sides, and very faintly and minutely notched above; the legs as in the female, the abdomen more globose.

Worker (minor).—The small worker has the antennæ and legs usually much paler than the worker (major).

Male.—Length 3½ lines. Nigro-fuscous, shining and elongate; the scape obscurely testaceous; the tips of the mandibles ferruginous; legs pale rufo-testaceous; the coxæ at their base, and the claw-joint of the tarsi, fuscous. Abdomen subæneous; the margins of the segments slightly rufo-piceous, and submembranaceous; the scale thickened, rounded, and widely emarginate above, very closely resembling the male of *F. cunicularia.*—For the differences see that species.

Sp. 5. *Formica fuliginosa.*

Fœmina.—Nigra, nitidissima; antennis pedibusque pallide rufescentibus; mandibulis rufescentibus; capite magno, subcordato; squama parva, angusta, apice rotundata; marginibus lateralibus sub-parallelis: alis hyalinis, basi ad medium brunnescentibus, nervis et stigmate flavido-cinerascentibus.

Operaria.—Piceo-nigra, nitidissima; palpis, antennarum flagellis fere totis tarsisque pallide rufescentibus, tarsis tamen dilutioribus; capite magno sub-cordato; ocellis minutis: clypeo subcarinato: squama parva subovata, marginibus lateralibus parallelis.

Mas.—Piceo-niger, nitidus; corpore toto sparse pilosulo; articulis pedum et tarsis dilutioribus; occipite concaviusculo; squama exigua sub-quadrata, parum rotundata, alis sicut in fœmina.

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Formica fuliginosa, Latr. Hist. Nat. Fourm., p. 140, tab. 5, fig. A—D, ♂, ♀, ☿; St. Farg. Hym., i. 200, 2; Jurine, Hym., p. 273; Losana, Form. Pied., No. 9; Nyland. Adno. Mon. Form., p. 915, 12; Foerster, Hym. Stud. Form., p. 38, 17.

Female.—Length 2¾ lines. Of a shining deep nigro-piceous colour; mandibles ferruginous; clypeus smooth and shining; ocelli distinct and glassy; the eyes have a short scattered pubescence; antennæ, palpi and legs testaceous, having a cinereous pilosity; wings hyaline, the basal half smoky; the scale small, oblong, rounded and ciliated above; abdomen oblong ovate, as long as the thorax, about the same width as the head, the apical segment pilose, the extreme apex testaceous.

Worker.—2 lines. Resembling the female, the legs being darker; the scape and apex of the joints of the flagellum fuscous; the mandibles obscure ferruginous; the ocelli very minute; the scale minute, abdomen scarcely as wide as the head, sub-ovate, the extreme apex pilose.

Male.—2 lines. Coloured as in the female; mandibles reddish brown, broadly dilated at their apex; the flagellum and tarsi pale testaceous; the scutellum and metathorax very smooth and shining, wings as in the female: abdomen sub-conical, rounded at the base, pointed at the apex, having some thinly scattered long pubescence.

This species is distributed in all parts of the country, its usual habitat being in decaying trees, posts, &c., in which it forms its tortuous galleries; the perforations are stained black, probably by a peculiar acid discharged by this species. When the *F. rufa* takes up its abode in an old decayed tree all its galleries are of the original colour of the wood, thus proving some peculiarity in the present species. As I observed before I found a colony of this Ant in a sandy bank at Southend. I have found the males and females at the end of July and beginning of August, but I have met with a male in October.

Sp. 6. *Formica umbrata.*

Fœmina.—Nitida, cinerascenti-sericea, pilis brevibus adspersis, pallido-fuscis; partibus oris, antennis, pedibusque pallide testaceis; capite thorace paululum latiori; oculis hirtulis; alis albescenti-hyalinis a basi fere ad medium fusco-umbratis, nervis brunnescentibus, stigmate fusco; squama subpentagonali, apice late obtuse-angulatim emarginato.

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Operaria.—Pallide rufo-flavescens, oculis parcissime hirtulis; pube corporis sericea subtiliori, pilis brevibus erectis sparsis paullo brevioribus, rigidiusculis.

Mas.—Fusco-niger, nitidus; tenuissime cinerascenti-sericeus et pilosulus; palpis, antennarum flagellis, pedum articulis tarsisque testaceo-pallescentibus; capite sat magno, paululum latiori thorace; oculis hirtulis; alis albescenti-hyalinis; squama petioli subovali apice subangulatim emarginato.

Formica umbrata, Nyland. Addit. Adno. Mon. Form., p. 1048, 17; Smith, Append. Cat. Brit. Hym., p. 116; Foerster, Hym. Stud. Form., p. 39, 18.

Formica brunnea, Smith, Cat. Brit. Hym. p. 2, 4.

Female.—3-3½ lines. Fusco-testaceous, densely covered with a fine cinereous sericeous pile: head a little wider than the thorax, mandibles rugose, rufo-testaceous; the antennæ, the face beneath their insertion, and the legs, pale rufo-testaceous; the eyes thinly covered with short erect hairs; the head posteriorly deeply concave; the basal half of the wings brown; the scale oblong, nearly straight above, the lateral angles rounded, legs stouter and shorter than in *F. flava:* abdomen ovate.

Worker.—Very closely resembling *F. flava*, but is rather larger; the eyes are pubescent, and the scape stouter.

Male.—1½ lin. Resembles *F. flava;* but the eyes are pubescent, the scale emarginate above, and the wings usually clouded at their base; the basal joint of the flagellum stouter and more globose than in *F. flava.*

This species bears a close resemblance to *F. flava*, but is easily distinguished from it, the eyes being pubescent: this cannot be seen unless a high microscopic power be used, then it is visible in all the sexes. The female may be known, if winged, by having the wings brown at their base; if not winged, the size of the head will distinguish it; in *umbrata* it is *wider* than the thorax, in *flava* it is *narrower;* the workers are difficult to separate, the head is larger, more shining, and is not covered with a dense pile as in *flava;* the scape also is less attenuated at the base and altogether stouter: the ocelli are very distinct. Of the male, I have only seen a single specimen, this has the nervures fuscous, and the wings smoky at their base; the scale is notched and the eyes pubescent. Nylander says the wings are sometimes hyaline, sometimes smoky at their base; and the scale distinctly emarginate.

I have frequently found the female of this species on Hampstead Heath, but I have not been successful in discovering its *Formica-*

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rium; Mr. Dale has taken all the sexes, and from his specimens I have described the female and worker; the male is from Lewes, near Brighton.

Sp. 7. *Formica flava.*

Fœmina.—Pallide fusca, dense flavido-sericea, antennis pedibusque pallide testaceo-cinerascentibus; alis hyalinis, versus basin parum infuscatis, nervis et stigmate flavido-cinereis; squama subovali, supra late obtuse angulatim emarginata.

Operaria.—Flavo-testacea, lata, nitida, sericeo-micans sparseque flavido-pilosula; oculis minutis atris ovalibus, ocellis minutissimis; squama parva subovali, supra rotundata vel truncata.

Mas.—Fuscus, nitidissimus; palpis, antenarum flagellis, pedum articulis et tarsis flavido-testaceis; flagellorum articulo primo crassiusculo; fronte media levissime transversim subimpressa; alis subhyalinis, nervis pallide testaceis, quandoque pallide fuscescentibus; squama subquadrata.

Formica flava, De Geer, Ins., ii. 1089, 5, tab. 42, fig. 24; Fabr. Ent. Syst., ii. 357, 34; Latr. Hist. Nat. Fourm., p. 166, tab. 7, fig. 36, ♂ ♀ ☿; St. Farg. Hym., i. 408, 9; Losana, Form. Pied., 17; Nyland. Adno. Mon. Form., 922, 17; Foerster, Hym. Stud. Form.

Formica rubra, Zett. Ins. Lapp., p. 450, 8.

Female.—Length 3 lines. Pale fuscous, the face below the insertion of the antennæ, the palpi, antennæ, scale and legs, of a pale testaceous-yellow; the mandibles usually rather inclined to ferruginous; the teeth which arm their apex and the superior margin of the abdominal scale fuscous; the body densely clothed with a fine yellow cinereous pile; the head not so wide as the thorax, the clypeus very convex, smooth and shining; wings hyaline, sometimes faintly smoky towards their base. Abdomen oblong-ovate, having a fine silky pile; as long as the head and thorax, the margins of the segments narrowly pale testaceous.

Worker.—Entirely pale yellow, the mandibles pale ferruginous, the eyes small and black; in small individuals the ocelli are obsolete, or not distinguishable without a high microscopic power, in larger individuals distinctly visible: head behind slightly concave; the scale subovate, its superior margin nearly straight; abdomen beneath having usually a dark fuscous spot, obsolete in some individuals, after death particularly, but usually present in living ones.

Male.—Dark fuscous, shining, having a sparing cinereous pile, most dense on the head and abdomen; the clypeus smooth and

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shining, having a transverse depressed line at its anterior margin; the eyes and ocelli prominent, the latter has the posterior pair elevated on the vertex; wings hyaline, the nervures pale testaceous; the scale nearly square: abdomen slightly pubescent and pointed at the apex.

The female of *F. flava* is very likely to be confounded with the female of *F. nigra;* it may be distinguished by the form of the discoidal cell, which is much narrowed towards the first cubital cell, in *fusca* it is slightly narrowed, or subquadrate; the wings of *fusca* are different, being milky-white; the abdominal scale is also very different to that of *fusca.*

The male of *F. nigra* may be distinguished by its amplitude of wings, which are $2\frac{1}{2}$ lines long, those of *flava* are $1\frac{3}{4}$ lin.

This is probably the most universally distributed species in this country; it is found everywhere, and is well known as the turf Ant; it raises its nests in fields and on banks, and abounds in some of our open moor lands to an incalculable extent.* By diligent search I have little doubt that its two congeneric species, *F. umbrata* and *F. affinis*, will prove to be of frequent occurrence. This Ant constructs its *Formicarium* under stones in fields; and here will be found the interesting *Claviger foveolatus*, in societies formed in banks; its detection is difficult: we are only on the threshold of our investigations of these interesting insects, and some future Monographist will probably double the number of the species at present known to be indigenous.

Sp. 8. *Formica nigra.*

Fœmina.—Fusco-nigrescens, dense undique cinereo-micans, nitida, mandibulis antennis obscure rufescentibus; pedum articulis tarsisque pallide rufescentibus; alis lacteo-albis, nervis et stigmate pallide testaceis; squama verticaliter subrectangulari, supra angulis rotundatis et medio subangulatim emarginato.

Operaria.—Fusco-nigra, cinereo-micans, nitida, sparse flavido-pilosula, antennarum scapis et mandibulis rufescentibus; tarsis, pedum articulis pallide testaceis; squama subrectangulari, supra parum vel vix emarginato.

Mas.—Fusco-niger, parum cinereo-micans, nitidus; antennarum flagellis fuscescentibus, articulo primo crassiusculo; squama parva, transversim subrectangulari, supra parum concaviuscula.

* I have found the winged male in the *Formicarium* as late as the 5th of November.

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Formica nigra, Linn. Faun. Suec., p. 426, No. 1722; Syst. Nat., i. 963, 4, ♀; Scop. Ent. Carn., p. 834; Fabr. Ent. Syst., ii. 350, 10; Schrank, Ins. Aust., p. 823; Latr. Hist. Nat. Fourm., p. 156, ♂, ♀, ☿; St. Farg. Hym., i. 206, 7; Losana, Form. Pied., 11; Nyland. Adno. Mon. Form. p. 920.

Formica fusca, Foerster, Hym. Stud. Form.

Lasius niger, Fabr. Syst. Piez., p. 415, 1.

Female.—Length 3½ lines. Fuscous, densely covered with cinereous silky pubescence; the head shining; the mandibles, anterior margins of the face on each side of the clypeus, the flagellum and legs rufo-testaceous, the tarsi and joints of the latter palest; the ocelli distinct, and of a glassy brightness, eyes sparingly pilose; the head is narrower than the thorax. Thorax smooth and shining; wings of milky whiteness, hyaline and iridescent, the nervures of a testaceous yellow, costal nervure fuscous; the scale deeply notched above, the lateral angles rounded, the sides nearly straight. Abdomen elongate-ovate, rather longer than the head and thorax; the margins of the segments membranaceous, and narrowly pale testaceous; the silky gloss varying in brilliancy in different lights.

Worker.—Length 1¼—1⅓ lines. The head and legs coloured as in the female; eyes not prominent, the ocelli very minute, scarcely distinguishable without a high microscopic power; in small individuals, the thorax similar in form to *F. flava*, abdominal scale small, vertical and subrectangular, minutely notched above. Abdomen ovate, thinly sprinkled with yellow hairs, particularly the apical segments; the margins of the segments obscurely membranaceous, shining and thinly sprinkled with long hairs beneath.

Male.—Length 1¾ lin. Dark fuscous, the tubercles at the base of the scape of the antennæ and the tips of the mandibles rufo-testaceous; the basal joint of the flagellum short, obconical, much stouter than the following joints; eyes and ocelli prominent, the vertex slightly concave. The wings, as in the female, more ample than in *F. flava*, the discoidal cell frequently obsolete; the scale small, scarcely emarginate above. Abdomen ovate, the margins of the segments narrowly and obsoletely testaceous.

This Ant is best known in England as the garden Ant; it forms its nest usually in the ground, but not uncommonly in old brick walls, &c.; it is found in woods, fields, gardens, and even in the middle of towns, where I have frequently observed the pave-

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ment covered with the glittering winged males and females; and I once noticed some swallows skimming along the pathway, feasting on the Ants, when swarming as I have stated above.

Genus Tapinoma, Foerst.

Maxillary palpi 6-jointed, labial palpi 4-jointed; antennæ inserted in the middle of the face, filiform, eyes placed before the middle, a little within the sides of the head; the abdomen having a scale at its base, substituting the first segment, the scale oblong, decumbent, received into a fovea at the base of the abdomen.

Although the insects which form this genus partake of most of the characters of the genus *Formica*, still all the species which I have seen have the flagellum either filiform or subfiliform, and the decumbent scale forms, apparently, a gradual approach in form to the *Poneridæ;* I have therefore retained Foerster's genus. I am acquainted with five species; one, which appears to be undescribed, I have the pleasure of adding myself; it was captured by Mr. Dale in Wales.

Tapinoma erratica.

Fœmina.—Nigro-fusca, cinerascenti-micans, pilositate abdominis dorso vix conspicua; pedibus fuscis, tibiarum apice tarsisque rufescentibus; metathorace dorso abbreviato, squama oblonga, subrectangula, depressa, fovea basali segmenti secundi recepta, vix conspicua; abdomine thorace latiori ventreque pilositate longiori et magis conspicua prædito.

Operaria.—Nigra, nitida, glabra, angustior, palpis et pedibus fuscis, geniculis tarsisque rufo-pallidis; squama sicut in fœmina; abdomine subrotundato.

Mas.—Niger, nitidus, antennis thorace longioribus; mandibulis multidentatis, apice acutissimo, pedum articulis tarsisque pallide rufescentibus; squama crassa, oblonga, supra rotundata; alis fusco-hyalinis; abdomine oblongo-ovata.

Formica erratica, Latr. Hist. Nat. Fourm., p. 182.

Formica glabrella, Nyland. Addit. Adno. Mon. Form., p. 38 ☿.

Tapinoma collina, Foerster, Hym. Stud. Form., 43, 21, Gen. 2, ♀, ☿.

Female.—Length 2 lines. Not yet found in this country, the above diagnosis is from Foerster's Monograph.

Worker.—Length 1½ lin. Black, elongate, smooth and shining, not pubescent; the scape obscurely ferruginous towards the base, the extreme base of the flagellum rufo-testaceous; the teeth of the

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mandibles ferruginous; ocelli not apparent; eyes round, the facets of a crystalline brilliancy. Thorax compressed, metathorax very oblique, smooth and shining, the scale small, elongate, inclining forwards, almost decumbent; legs dark rufo-testaceous, the joints and tarsi pale testaceous; abdomen sub-ovate, produced anteriorly, overhanging and concealing the scale.

Male.—Length 2 lines. Black, the antennæ elongate, reaching to the apical margin of the first segment of the abdomen, the first joint of the flagellum scarcely thicker than the second, all the joints of about equal length, the second and third a little longer than the basal joint; the ocelli prominent, of a glassy brightness, the clypeus convex, the mandibles produced, very stout, the inner margins straight and serrated, their apex terminated by an acute stout incurved tooth. Thorax elongate, rounded anteriorly, smooth and shining. the metathorax rounded posteriorly, sub-opaque, and having a depression or fossulet in the middle above; legs dark rufo-testaceous, the joints and tarsi pale testaceous; wings fusco-hyaline, nervures and stigma fusco-testaceous; scale of the abdomen decumbent, incrassate, rounded at its superior margin, not concealed as in the worker; abdomen elongate-ovate, margins of the segments narrowly and obscurely testaceous.

The insect which I have described as the male I think must be correctly assimilated. The worker and male were both captured by J. C. Dale, Esq., in 1846; the workers in Scotland, the male at Bournemouth. This is a very interesting addition to our Fauna, quite a new form, approaching somewhat to that of *Ponera*, through which we pass to the division which have two nodes to the abdomen, constituting the family *Formicidæ;* the habit of *F. collina* also approaches to that of our British representative of the group *Poneridæ*—*P. contracta*—which is found usually under stones, in which situation Mr. Dale informs me he met with the present species. I have only seen two workers and one male, all captured by and in the collection of Mr. Dale.

Tapinoma polita, n. s.

Operaria.—Rufo-testacea, antennis filiformibus; lævis, tota nitidissima, nuda; antennis, mandibulis, pedum articulis et tarsis pallide testaceis.

Worker.—Rufo-testaceous, smooth and shining; head elongate, the sides slightly curved or rounded, having a few scattered long hairs, slightly emarginate behind; the scape as long as the head,

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and of about the same length as the flagellum, the latter nearly filiform, the two apical joints being only slightly thickened. Thorax: smooth and shining, rounded anteriorly, slightly narrowed posteriorly, and strangulated at the junction of the meso- and metathorax, the latter emarginate behind, the emargination extending the entire width, the lateral angles obtuse; the scale of the abdomen decumbent, elongate, slightly narrowed at the base and rounded above. Abdomen ovate, smooth and shining, sprinkled with a few long pale hairs.

The only species which approaches this insect is the *Tapinoma nitens* of Mayr; but that has the scape shorter than the flagellum, and the latter is sub-clavate, the scale is much wider above, and the abdomen dark rufo-fuscous. I have only seen the single example described; it is in the collection of J. C. Dale, Esq., who captured it in Wales.

Fam. 1. PONERIDÆ, Smith.

Genus Ponera, Latr.

Head elongate, flagellum of the antennæ clavate in the females and workers, filiform in the males; inserted before the middle of the face: the maxillary palpi short, subsetaceous, 6-jointed, the labial palpi 4-jointed; the clypeus short, transverse; the ocelli and eyes obsolete in the workers; wings having one marginal, two sub-marginal and two discoidal cells; the abdominal scale sub-nodiform, incrassate; the margins of the second and third segments constricted.

Sp. 1. *Ponera contracta.*

Fœmina.—Elongata, sub-cylindrica, fusca; mandibulis, clypeo, antennis pedibusque pallide rufis; oculis magnis, subovalibus, hirtulis; ocellis distinctis; capite magno, confertim punctulato, sub-opaco; alis hyalinis, nervis subflavescentibus: squama altissima, crassa, antice convexa, postice lævissima concaviuscula; abdomine elongato-ovali, margine parum fusco-testacea.

Operaria.—Fusco-brunnea, sub-nitida, pube cinerascenti subdepressa, pilis sparsis erectis; oculis obsoletis, ocellis nullis.

Mas.—Niger, nitidissimus, pube sericea; pedibus fuscis, tibiis tarsisque rufescentibus; antennis elongatis, scapo minimo, pedicello subgloboso, reliquis articulis cylindricis; oculis valde prominulis, ocellis sat magnis; abdominis segmento primo squama crassa, antice posticeque subconvexa; segmento ultimo processu spiniformi deorsum flexo; alis ut in fœmina.

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Formica contracta, Latr. Hist. Nat. Fourm., 195, tab. 7, fig. 40, ♀ ; Fabr. Syst. Piez., p. 410, 58.

Ponera contracta, Latr. Gen. Crust. et Ins., iv. p. 128 ; St. Farg. Hym., i. 195, 8 ; Steph. Illus. Brit. Ent. Supp., p. 15, tab. 42, fig. 2; Foerster, Hym. Stud. Form., p. 45.

Female. — Length 1¾ lin. Elongate, subcylindrical, shining rufo-fuscous ; the antennæ, clypeus and mandibles rufo-testaceous; the eyes large and ovate, situated anteriorly at the sides of the head, opposite the insertion of the antennæ, which approximate at their base; the ocelli placed in a triangle on the vertex ; a longitudinal impressed line extends from the anterior stemma to the base of the antennæ; the vertex slightly emarginate its entire width. Thorax elongate, the sides nearly parallel, rounded anteriorly ; the metathorax sub-truncate, very slightly oblique; the scutellum, post-scutellum and legs, rufo-testaceous, the tarsi palest ; wings having one elongate marginal cell, two elongate submarginal, and one discoidal cell. Abdomen, the node incrassate, vertical, rising above the base of the following segment, rounded above ; the margins of the second and third segments constricted; the extreme apex pale rufo-testaceous.

Worker.—Black, or dark fuscous ; elongate and sub-cylindrical; smooth and shining ; head elongate, wider than the thorax, very finely and closely punctured ; eyes and ocelli wanting ; the face below the insertion of the antennæ, the latter, as well as the legs and extreme apex of the abdomen, rufo-testaceous ; the mandibles large and triangular, their inner edge very finely denticulate ; the flagellum clavate ; the prothorax convex, rounded anteriorly, behind which the thorax is compressed; the metathorax slightly oblique : scale of the abdomen thickened, broad, and rounded above ; the margins of the two following segments constricted, the first most strongly so; the margins obscurely rufo-testaceous ; the apex pale rufo-testaceous.

This insect was discovered to be indigenous by Mr. J. O. Westwood, who captured it in St. James's Park.

I only possess the worker and female ; the diagnosis of the male is from a foreign specimen. *P. contracta* is rare in this country; its communities being small and their living under stones and other substances, as well as their minute size, combine to render their detection difficult. I have never seen the insect alive.

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Fam. 2. MYRMICIDÆ, Smith.

Genus Myrmica, Latr.

Manica, Jurine.

This genus of ants is separated from *Formica* by very essential characters, which consist of the following differences: the abdomen has its two basal segments contracted into two nodes, the females and workers are armed with stings, and the pupæ are not enclosed in cocoons, but cast off a thin pellicle, like the pupæ of many Fossorial *Hymenoptera;* their labial palpi are 4-jointed, their maxillary palpi 6-jointed.

The males and females winged, the latter temporarily so. The males and females furnished with ocelli, which are wanting in the workers.*

Sp. 1. *Myrmica scabrinodis.*

Fœmina. — Rufo-testacea, sparse flavido-pilosula; capite supra, scutello abdominisque dorso medio fuscescentibus; scapo ad basin arcuatim flexo; capite, thorace et petiolo longitudinaliter striatis, profunde rugosis; metathorace spinis longiusculis; alis hyalinis, versus basin parum infuscatis, stigmate ejusdem coloris distincto.

Operaria.—Rufo-testacea, sparse flavido-pilosula, capite supra, abdominisque dorso medio fuscescentibus; capite, thorace et petiolo longitudinaliter striatis, profunde rugosis; antennarum scapo ad basin arcuatim flexo, flexura supra angulata; metathoracis spinis longis.

Mas.—Nigro-fuscus, nitidus, sparse tenuiter flavido-pilosulus; mandibulis, pedum articulationibus tarsisque testaceo-pallescentibus; antennis fusco-rufescentibus; scapo longitudine quintæ partis totius antennæ; abdominis apice pallide rufescentibus.

Myrmica scabrinodis, Nyland. Adno. Mon. Form., p. 930, 3, ♂, ♀, ☿; Foerster, Hym. Stud. Form., 66, 36.

Myrmica rubra, Curtis, Trans. Linn. Soc., xxi. 213, 1.

Myrmica cæspitum, Zett. Ins. Lapp., 460, 1 ♂.

Female.—Length 2½ lines. The head above and the clypeus fuscous; beneath, the sides, the face on each side of the clypeus,

* None of the British species of the genus *Myrmica* spin a cocoon, and this appears to be the case with the majority of the *Myrmicidæ;* but the genus *Myrmecia*, Fabr., is an exception to the rule. I possess the pupa, and silken cocoon from which it was extracted, of a species closely allied to *M. gulosa*, from New Holland.

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the mandibles, and the antennæ, rufo-testaceous; the scape stout, of nearly equal thickness the entire length, and bent at the base, the curvature produced in front into a sharp angle; the head and thorax above, rugose-striate; the spines which arm the metathorax long, stout, and acute at their apex; the nodes of the abdomen coarsely rugose; the wings hyaline, faintly coloured towards their base; the nervures and base of the stigma rufo-testaceous. Abdomen subovate, smooth and shining, dark fusco-ferruginous, the base and apex pale ferruginous, thinly sprinkled over with shining yellow hairs.

Worker.—Length 1½—2 lines. The sculpture as in the female; the ocelli obsolete, the general colouring usually paler, particularly the head and thorax; the head perhaps scarcely so deeply striated; the scape is bent and angulated in the same manner as in the female; the thorax is more compressed at the sides, being narrower towards the metathorax than in the female; the nodes as in that sex, the legs rather more slender; the abdomen proportionably smaller.

Male.—Deep nigro-fuscous; the apical joints of the flagellum, the tubercle at base of the scape, the mandibles, the apex of the femora and the tarsi, pale rufo-testaceous; the mandibles usually pale yellow; the scape short and stout, about one-fifth of the entire length of the antennæ; the antennæ and legs thinly sprinkled with pale glittering hairs; the wings smoky towards their base. Abdomen smooth and shining, pale testaceous at the apex, the nodes shining above, the anterior one has a shining depression behind; the metathorax is deeply notched and produced into an angulated process on each side, the scutellum and sides of the metathorax striated; the entire insect sprinkled with pale glittering hairs.

This is a very abundant species: it is found in all parts of the kingdom, and is frequently met with, occupying one side of the same hillock in which *Formica flava* has formed its habitation; it is met with in great profusion in hilly districts, forming its subterranean channels under stones; in the nest of this insect I met with a specimen of *Batrisus formicarius*, in Yorkshire.

Sp. 2. *Myrmica ruginodis.*

Fœmina.—Testaceo-ferruginea, sparse flavido-pilosa, capite supra, abdominis dorso medio, scutello et macula ventrali plus minusve fuscescentibus; scapo ad basin arcuatim flexo; capite, thoraceque longitudinaliter striatim-rugosis; metathoracis spinis

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longiusculis; alis hyalinis, nervis cum stigmate sub-flavescentibus; nodis petioli rugosis.

Operaria.—Testaceo-ferruginea, sparse flavido-pilosula; capite supra abdominisque dorso medio et macula ventrali plus minusve fuscescentibus; scapo basin versus arcuatim flexo; capite thoraceque longitudinaliter striatim-rugosis; metathoracis spinis binis validiusculis longis; nodis petioli rugosis.

Mas.—Nigro-fuscus, nitidus, parcissime tenuiter flavido-pilosulus; mandibulis, articulationibus pedum et tarsis testaceo-pallescentibus; scapo elongato, fuscescente, abdomine supra obscure rufescente.

Myrmica ruginodis, Nyland. Adno. Mon. Form., 929, 2; Foerster, Hym. Stud. Form., p. 66, 36.

Myrmica vagans, Curtis, Trans. Linn. Soc., xxi. 213, 3.

Female.—Length 2½ lines. This sex so very closely resembles that of the preceding, that it is only necessary to point out the distinctions of the present species. The scape is more slender, gradually narrowing to the base, which is bent, but not angulated in front of the arcuation; the flagellum is also more slender, and the joints rather longer; the mesothorax is not so deeply rugose-striate, and the thoracic spines are not quite so stout and are more bent inwards towards each other.

Worker.—Differs from that of the preceding species in the same characteristics as the female.

Male.—At once distinguished from that of the preceding species by having the antennæ rather longer than the thorax, the scape being about one-third of their entire length; they are usually also paler coloured, and the entire insect is less pilose, particularly the head and legs; the tarsi are more elongate and slender; the metathorax is less deeply notched, and sub-angulated laterally.

This is in all probability the species described by Linnæus as *Formica rubra*, since it usually possesses the character pointed out by the author, "punctum nigrum sub abdomine;" but, as I have observed this character in some examples of other species, I have not thought myself warranted in changing the name: the species is equally abundant with the foregoing, and found in similar situations.

Mr. Curtis quotes this species as being the *Formica vagans* of Fabricius, but the description of that author would equally well

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suit either this, the preceding, or following species; therefore until the typical specimen can be examined I retain Nylander's name for the species.

Sp. 3. *Myrmica lævinodis.*

Fœmina.—Sordide testaceo-ferruginea, sparse flavido-pilosula; capite, pronoto, scutello abdomineque supra et infra in medio fuscescentibus; capite thoraceque longitudinaliter striatim-rugulosis; metathorace spinis brevibus validiusculis: nodis petioli sublævibus; alis hyalinis.

Operaria.—Testaceo-ferruginea, sparse flavido-pilosula, capite supra abdominisque dorso medio et macula ventrali plus minusve fuscescentibus; capite et thorace longitudinaliter striatimrugulosis; metathorace spinis binis validiusculis; nodis petioli sublævibns.

Mas.—Nigro-fuscus nitidus, sparse flavido-pilosulus; mandibulis tarsisque pallide testaceis; antennis scapo valde elongato, metathorace inermi, tuberculis utrinque sub-obsoletis; antennis, trochanteribus, tibiis abdomineque plus minusve conspicue fusco-pallescentibus; alis hyalinis, basin versus obsoletissime subfuscescentibus.

Myrmica lævinodis, Nyland. Adno. Mon. Form., p. 927, 1; Foerster, Hym. Stud. Form., 46, 35; Curtis, Trans. Lin. Soc., xxi. 213, 2.

Female.—Length 2¼ lines. Fusco-testaceous: the head dark fuscous, the mandibles and antennæ pale testaceous, the apical joints more or less ferruginous; the thorax above usually rufo-testaceous, sometimes only the scutellum; the metathoracic spines short, stout and acute, slightly divergent; wings hyaline, the nervures pale rufo-testaceous, the stigma slightly fuscous; the anterior node smooth and shining above, posteriorly, as well as the second node, obsoletely roughened. Abdomen smooth and shining, more or less fuscous above, and having sometimes a fuscous spot beneath; the scape of the antennæ attenuated at the base, and slightly bent.

Worker.—Differs very slightly in any respect from the female, except in being smaller: the mandibles are ferruginous, and the nodes of the abdomen faintly rugose.

Male.—Length 2 lines. Dark fuscous, the head less shining than the thorax and abdomen, and obsoletely rugose; the man-

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dibles pale testaceous; antennæ rufo-testaceous, the scape above, and the three apical joints of the flagellum, slightly fuscous; ocelli of a glassy brightness, very prominent, as well as the eyes; thorax: the mesothorax very prominent, anteriorly smooth and shining, as well as the metathorax posteriorly, which is slightly notched and laterally sub-angulated; wings hyaline, nervures pale testaceous, the stigma slightly fuscous; the nodes and the abdomen very glossy, the apex of the latter pale testaceous; the articulations of the legs and the tarsi pale testaceous.

This species most closely approaches *M. ruginodis;* the female of the present species, however, may be distinguished by having the spines of the thorax smaller, being short angular processes, very acute at their apex, not bent spines, as in *M. ruginodis;* the smooth nodes will also serve to distinguish it. The worker has the spines longer than the female; the thorax is not so coarsely sculptured as in *M. ruginodis,* and the nodes are smooth and shining, the sculpture on them being very delicate. The male has the antennæ shorter than in *M. ruginodis,* and intermediate, as it were, between *M. ruginodis* and *M. scabrinodis;* the scape is about one-third of the entire length.

This species does not appear to be so abundant as either of the foregoing; I have only met with it in Sandown Bay, and in Luccomb Chine, Isle of Wight; Mr. Baly found it at Folkestone; I suspect it is a local species in this country.

Sp. 4. *Myrmica sulcinodis.*

Fœmina. — Ferruginea, sparse flavido-pilosula, capite et abdomine fusco-nigrescentibus; mandibulis, antennis, thorace pedibusque pallido-ferrugineis; capite, thorace et petiolo longitudinaliter striatis, profunde exaratis; antennarum scapo ad basin parum subcurvato; metathoracis spinis longis.

Operaria. — Sordide rubida, sparse flavo-pilosula, capite abdomineque fusco-nigrescentibus; mandibulis antennisque pallide rufescentibus; capite, thorace et petiolo longitudinaliter striatis, profunde exaratis; antennarum scapo ad basin parum curvato: metathorace spinis longis.

Mas.—Nigro-fuscus, nitidus, parcissime tenuiter flavido-pilosulus: mandibulis, antennarum flagellis, articulationibus pedum tarsisque pallide rufo-testaceis; alis hyalinis, nervis pallide testaceis; capite, metathorace supra, nodis segmenti primi longitudinaliter striatim-rugulosis.

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Myrmica sulcinodis, Nyland. Adno. Mon. Form., p. 934, 5.
Myrmica perelegans, Curtis, Trans. Linn. Soc., xxi. 214, 5, tab. 4, fig. 15 ♂, 16 ♀, 17 ☿.

Female.—Length 2½ lines. Head and abdomen very dark rufo-fuscous: sometimes the latter is nearly black; the scape usually rather darker than the flagellum and slightly fuscous above, but at other times the antennæ are entirely rufo-testaceous; the legs also differ in being sometimes entirely pale-red, sometimes only the tarsi are pale, according to the maturity of the insect; the head is longitudinally roughly rugose; the thorax and nodes of the abdomen longitudinally rugose-sulcate: the spines of the metathorax elongate, acute, and curving slightly inwards; the scape is slightly curved at the base; the wings clear hyaline, the nervures and stigma pale testaceous; abdomen very glossy and sprinkled with pale glittering yellow hairs.

Worker.—Length 2 lines. Differs from the female scarcely in anything except size; the spines are however more erect, and the workers are usually darker in colour.

Male.—Length 2¼ lines. Dark fuscous, sometimes nearly black, the head longitudinally roughly rugose; the mandibles, flagellum, and apex of the scape, pale rufo-testaceous, the latter frequently fuscous above at the base, sometimes only slightly so; thorax above longitudinally sulcate, most deeply so on the metathorax above and at the sides; the metathorax sub-marginate behind, ths posterior truncation smooth and shining; the joints of the legs, as well as the tarsi, pale rufo-testaceous; the wings of a pale yellow hyaline; the nervures and stigma pale testaceous; the apex of the nodes and of the abdomen pale rufo-testaceous.

This distinct species appears to be very local; I have never met with it. Mr. Dale has captured the male and worker in Wales, and I am indebted to Mr. Curtis for examples of the sexes taken at Bournemouth, Hampshire: the male is here described for the first time. Possessing several specimens of Nylander's species, presented by himself, and also others from M. Mayr, of Vienna, I have been unable to recognise the slightest difference between these and specimens presented by Mr. Curtis.

Sp. 5. *Myrmica denticornis.*

Fœmina.—Testaceo-ferruginea, sparse flavido-pilosula; capite supra abdominisque dorso medio fuscescentibus; mandibulis et pedibus flavido-testaceis; alis hyalinis, nervis testaceis, capite

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striatim rugosis; thorace et petiolo longitudinaliter striatis, profunde rugosis; antennarum scapo ad basin geniculatim flexo, geniculo supra acute denticulato.

Operaria.—Obscure rubida, sparse flavido-pilosula; cætera ut in præcedente.

Mas.—Fusco-pallidus, mandibulis pallide rufescentibus, thorace et petiolo sublævibus; alis sub-hyalinis, nervis et stigmate pallide fulvis.

Myrmica denticornis, Curtis, Trans. Linn. Soc., xxi. 215, 7, tab. 23, fig. 18, 19, ♂, ♀.

Female.—Head above, mesothorax, scutellum and abdomen, fusco-ferruginous; the metathorax and antennæ pale ferruginous; the scape, mandibles and legs pale rufo-testaceous; the mesothorax has on each side a longitudinal fuscous stripe uniting with a transverse one at the base of the scutellum; the scape is geniculated at the base, having at the upper angle an acute short tooth; the spines on the metathorax slightly divergent and curved slightly inwards, they are stout, long and acute.

Worker.—This strongly resembles the female in its sculpture, but is of an uniform dark fuscous red; the antennæ, mandibles and legs fulvous; the antennæ denticulate as in the female: in both sexes the first node of the petiole is ovate, the second globose, both being coarsely rugose.

Male.—Length 2½ lines. Pale dull castaneous, sparingly pubescent, the head irregularly and indistinctly striated; mandibles straw-coloured; the antennæ and legs fulvous; coxæ, tips of the femora and the tarsi pale testaceous; the margin of the scutellum and the articulations of the nodes of the abdomen pale testaceous; the basal node a little elongated and irregularly striate, the second node as well as the disk of the thorax smooth and shining, the latter faintly sculptured; the spines on the metathorax are short and acute, slightly divergent: wings slightly tinted, the nervures and stigma pale fulvous.

Mr. Curtis has described the worker and male of this very distinct species; the female I describe from the collection of J. C. Dale, Esq., who captured it as well as the worker in Scotland; it is most closely allied to the *M. lobicornis* of Nylander, but on comparison with specimens of that insect presented to me by that author, it is immediately seen to be abundantly distinct.

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Mr. Curtis captured this insect in Scotland in July, 1825, but did not find any females.

Sp. 6. *Myrmica longiscapa.*

Myrmica longiscapus, Curtis, Trans. Linn. Soc., xxi. 213, 4.

Mr. Curtis says, "this species resembles *M. lævinodis*, but the males are much smaller, the antennæ much longer, and instead of the scape being only as long as the two basal joints of the flagellum, as in *M. lævinodis* and *M. rubra*, it is equal in length to the eight following joints. The head is less convex, there is no channel down the forehead, and the clypeus is testaceous: there is a fovea on the hinder margin of the second nodule; the wings do not differ; the females are very similar to those of *M. lævinodis*, but they are darker, and the basal nodule is shorter and stouter. The neuters are smaller and different in colour from those of *M. lævinodis*, being entirely ochreous, excepting the black eyes and a brownish cloud on the back of the abdomen."

I do not possess this species, which must approach very closely to *M. lævinodis;* the figure of the nodes of the abdomen of the female, in profile, appear to characterize a distinct species; the characters of the male, however, are those of *M. lævinodis*, respecting which there is evidently, in the above quotation, some misconception; in my typical specimens, named by Dr. Nylander, the scape is equal in length to 7 or 8 of the basal joints of the flagellum, and Nylander's description is, "scapus tertiam partem totius antennæ fere excedens, longitudine prope articularum 7 sequenti flagelli." Nylander does not mention the fovea on the second nodule, but it exists in all his specimens—the females and workers of *M. lævinodis* are both characterized by the fuscous cloud on the back of the abdomen, which renders the affinity of these species the closer.

Sp. 7. *Myrmica cæspitum.*

Fœmina.—Fusco-nigra, nitida, flavido-pilosula; mandibulis, antennarum flagellis, articulationibus pedum tarsisque pallidis; capite, pleuris et metathorace longitudinaliter striatis opacis; metathoracis spinis mediocribus validiusculis, obtusiusculis; alis hyalinis, stigmate cinereo-fusco.

Operaria.—Fusco-nigricans, sparse pallide pilosula; mandibulis, antennis pedibusque rufo-testaceis, articulationibus et tarsis

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rufo-pallescentibus; capite thoraceque subtiliter longitudinaliter rugulosis; spinis metathoracis minutis dentiformibus; nodis petioli sublævibus.

Mas.—Niger, parcissime flavido-pilosulus; mandibulis, antennis pedibusque sordide pallescentibus, flagellis et tarsis dilute pallidis; capite parvo thoraceque subtiliter striatulis; thoracis marginibus anticis et lateralibus nitidis; alis hyalinis, nervis pallescentibus, stigmate pallide fuscis: spinis metathoracis nullis; nodis sublævibus.

Formica cæspitum, Linn. Faun. Suec., No. 1726 ♀; Syst. Nat., 963, 11; Latr. Hist. Nat. Fourm., p. 251, tab. 10, fig. 63 ☿.

Formica binodis, Amœn. Acad., vi. p. 413, 94 ☿; and Sp. in Cab. Mus. Linn. Soc.

Myrmica fuscula, Nyland. Adno. Mon. Form., 935, 6 ♂, ☿, tab. 18, fig. 36, ☿; Addit. Adno., p. 1053, ♀; Foerster, Hym. Stud. Form., p. 56, 29.

Myrmica cæspitum, Curtis, Trans. Linn. Soc., xxi. 215, 8.

Manica cæspitum, Jurine, p. 279.

Female.—Length 3½ lines. Very dark fuscous, or quite black; the head narrower than the thorax, and longitudinally striate; ocelli of a glassy brightness; the mandibles and antennæ dark ferruginous; the scape, except the extreme apex, slightly fuscous, as well as the flagellum towards the apex, the apical joint paler; thorax somewhat flattened above, the mesothorax being on each side delicately and obliquely strigose; the scutellum finely strigose; the mesothorax has on each side, a little within and before the insertion of the wings, an abbreviated impressed line, and has in front a smooth shining space; the metathorax longitudinally rugose above, the lateral spines short, stout and sub-acute; the truncated portion of the metathorax below the insertion of the spines is transversely sulcate; the wings clear hyaline, the nervures very pale, the stigma pale fuscous; sometimes the wings are very faintly smoky at their base; the legs rufo-fuscous, their articulations, as well as the tarsi, rufo-ferruginous. Abdomen elongate ovate, rather broader than the thorax, and rather longer, the apical margins of the segments rufo-piceous; the first node is rugose, the second faintly roughened behind, the superior margin of both nodes smooth and shining.

Worker.—Length 1¼—2 lines. The colour like that of the

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female, but frequently paler, the legs being usually so; the head subquadrate, much wider than the thorax, and longitudinally striate, the mandibles and antennæ as in the female; the vertex is slightly concave behind, the angles being rounded; the thorax a little longer than the head, widest in front, finely longitudinally rugose-striate; the metathoracic spines short and acute; the nodes smooth and shining above, faintly strigose at the sides; the legs and abdomen as in the female.

Male.—Length 2½—3-lines. Dark fuscous, or black; head small, much narrower than the thorax, sub-opaque, longitudinally rugose-striate, ocelli glassy and bright; the mandibles, antennæ, joints of the legs and the tarsi, pale testaceous, the flagellum fuscous at the base. Thorax rounded and swollen anteriorly; on each side anteriorly is an oblique impressed line, meeting in the middle of the mesothorax; the angular shape thus formed is highly polished and impunctate; on each side before the insertion of the wings, about half-way between that and the oblique line, is an abbreviated impressed line; the centre of the thorax behind the angular shape in front is longitudinally striated; a shining space on each side surrounding the lateral impressed line; the scutellum transversely and very finely strigose; the metathorax longitudinally striate; wings hyaline, the stigma pale fuscous; the nodes obsoletely rugose. Abdomen ovate, smooth and shining; the apical margins of the segments pale rufo-testaceous.

The antennæ of the male have apparently only ten joints, but when viewed under a high power of the microscope, the third joint will be found to consist in reality of three joints; the fifth is composed of two, thus making the number really thirteen.

This is a local but abundant species on many parts of the coast; it appears to frequent such situations, I have not found it in any other; it is very plentiful at the back of the Isle of Wight, in Sandown Bay, Luccomb and Shanklin Chines; there are large colonies at Shoeburyness, below Southend, where in August I obtained all the sexes: Mr. Dale has taken it at Charmouth. I have little doubt of this being the *F. cæspitum* of Linnæus, as quoted by Latreille; it is certainly that of the latter author.

Sp. 8. *Myrmica acervorum.*

Fœmina.—Sordida, pallide rubida, sparse pilosula; capite, thorace abdomineque fusco-nigricantibus supra; capite longitudi-

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naliter striatulo; alis totis albo-hyalinis, spinis metathoracis mediocribus; nodis parum scabris.

Operaria.—Sordide rubra, sparse pilosula; capite abdomineque supra fuscescentibus; capite longitudinaliter striatulo; thorace nodisque petioli rugoso-scabriusculis, metathorace spinis mediocribus.

Mas.—Niger, cinereo-pilosulus; tibiarum basi apiceque, tarsisque dilute pallidis, metathoracis apice polito, utrinque angulatim tuberculato; alis lacteo-hyalinis.

Formica acervorum, Fabr. Ent. Syst., ii. 358, 38, ☿ ; Syst. Piez. p. 407, 50.

Myrmica acervorum, Zett. Ins. Lapp., 451, 3, ♀, ☿ ; Nyland. Adno. Mon. Form., 936, 7, ♂, ♀, ☿ ; Foerster, Hym. Stud. Form., 61, 32; Curtis, Trans. Linn. Soc., xxi. 215, 6.

Myrmica lacteipennis, Zett. Ins. Lapp., p. 452, 5, ♂.

Female.—Length 1⅛ lin. Head elongate, subquadrate; above the insertion of the antennæ, but not quite extending to the vertex, fuscous; the rest of the head pale ferruginous; the three apical joints of the antennæ fuscous; the thorax, legs and nodes pale ferruginous; the thorax indistinctly longitudinally striated, slightly fuscous at the insertion of the wings; spines of the metathorax short, stout and acute; the first node slightly roughened behind, the second smooth, or faintly sculptured. Abdomen oblong-ovate, dark fusco-ferruginous, pointed at the apex, and sprinkled with pale glittering hairs.

Worker.—Length 1⅛ lin. This scarcely differs from the female in anything but size, except in the usual compression of the sides of the thorax, and in the absence of the ocelli; the spines are rather stouter and longer, and the second node is rather more distinctly sculptured with fine striæ.

Male.—Black, the tarsi and articulations of the legs pale testaceous; the entire insect is thinly clothed with long cinereous pubescence; the antennæ apparently 12-jointed; the palpi minute, pale testaceous; the mandibles truncate at their apex.

This, like most of the small species, is rarely met with. I once found a colony on Shirly Common, under the bark of a decaying tree; it consisted of one female and about fifteen workers. Mr. Dale has taken it in the New Forest, at Glanvilles Wootton, and at Lulworth. I have also received it from Scotland.

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If this species be not identical with the *M. flavidula* of Nylander, it must be very closely allied.

Sp. 11. *Myrmica unifasciata.*

Fœmina. — Rufo-pallida, sparse setulosa, abdominis segmento secundo fuscescente; capite et mesothorace subtiliter longitudinaliter scabriusculis; alis hyalinis, nervis pallidis subobsoletis; spinis metathoracis minutis dentiformibus; nodis sublævibus.

Operaria. — Rufo-pallida, sparse setulosa; capite abdomineque fasciis fuscescentibus; capite longitudinaliter striato, thorace nodisque subtiliter rugoso-scabriusculis; spinis metathoracis mediocribus acutiusculis.

Mas. — Fusco-testaceus, nitidus; abdominis segmentis dilutioribus; metathorace tuberculis utrinque obsoletis; alis lacteo-hyalinis; nervis sub-obsoletis; antennis, palpis pedibusque pallide testaceis.

Formica unifasciata, Latr. Hist. Nat. Fourm., 257.
Myrmica unifasciata, Nyland. Addit. Adno. Mon. Form., p. 44; Curtis, Trans. Lin. Soc., xxi. 216, 12.
Manica unifasciata, Jurine, Hym., p. 279.

Female.—Length 1¾ lin. Rufo-testaceous: sprinkled with a few erect scattered hairs; the head finely longitudinally rugose-striate; the stemmata very prominent, and of a glassy brightness; the scape and base of the flagellum pale flavo-testaceous, the legs are of the same colour; antennæ apparently 12-jointed. Thorax rounded anteriorly, the mesothorax finely longitudinally striated; the insertion of the wings, the scutellum and post-scutellum, rufo-fuscous, the scutellum smooth and shining in the middle; the spines on the metathorax short and acute; the wings hyaline, the nervures scarcely discernible; the nodes nearly smooth, shining, the first slightly roughened. Abdomen ovate, smooth and shining, the first segment pale at the base, beyond which it is rufo-fuscous, sometimes entirely fuscous, or with the basal margins pale.

Worker.—Closely resembles the female, differs in wanting the ocelli, and in having the sides of the thorax compressed, and slightly strangulated at the apex of the mesothorax, which is much more finely sculptured than in the female, and granulated: the teeth on the metathorax minute, acute at their apex. Abdomen ovate, very smooth and shining, the first segment

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having a broad rufo-testaceous fascia; sometimes the following segment rufo-testaceous.

I have not captured the male of this species; the diagnosis is from a specimen sent to me by M. Mayr of Vienna, and from the only British example which I have seen in Mr. Dale's collection; the species is rare. I have usually taken it in winter in moss, but once met with a colony in some decayed wood, and captured several females; this was nearly twenty years ago, in Colney Hatch Wood, since which I have not found it. The late Mr. Wing found a colony at Lambeth, and Mr. Dale has taken it in the New Forest and at Lulworth; he has also captured the male, which I suspect to be the *Stenamma albipennis*. The species very closely resembles the *M. muscorum* of Nylander, which species is more strongly sculptured, and the thorax longer and more deeply strangulated. The male has scarcely the slightest trace of neuration in the wings.

Sp. 12. *Myrmica simillima.*

Operaria.—Rufo-pallida, abdomine fuscescente, basi pallido; capite longitudinaliter striolato; thorace longitudinaliter striatim-ruguloso; metathorace spinis parvis acutis dentiformibus.

Myrmica simillima, Nyland. MSS.; Smith, Cat. Brit. Hym., p. 118; Curtis, Trans. Linn. Soc., xxi. 216, 10.

Worker.—Length ¾ line. Head, thorax and nodes of the abdomen rufo-testaceous; the mandibles, flagellum and legs pale flavo-testaceous; abdomen shining, rufo-fuscous, pale at the base and extreme apex; head longitudinally strigose; antennæ 12-jointed. Thorax above rugose-striate; nearly transverse anteriorly or very slightly rounded, the angles acute, the usual divisional suture between the meso- and metathorax obsolete; the sides are doubly notched; the metathoracic spines short, lentiform and acute; the thorax is gradually narrowed towards the metathorax, which is truncate at the apex. Abdomen highly polished, and more or less rufo-fuscous, varying a little in different individuals; the nodes are finely rugose, the first being the most coarsely so. The entire insect is very thinly sprinkled with short erect pale hairs, most apparent on the abdomen at its apex.

I received this insect some years ago from Mr. Dale, who informed me that he had found them near his house at Glanvilles Wootton, Dorsetshire. It is closely allied to *M. tuberum*; indeed I had considered it to be that species, and as such had included

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it in my British list, but Dr. Nylander presented me with the insect which is considered on the continent to be Latreille's *F. tuberum: M. simillima* differs in being much more deeply sculptured on the head, thorax and nodes of the abdomen, but it agrees in the essential and most characteristic specific distinction pointed out by Latreille, "le corcelet est court, conique, tronqué, comprimé insensiblement sur les côtés, aux le dos continu." For the sake of uniformity of opinion, however, I adopt with pleasure the views of Dr. Nylander, and other eminent Hymenopterists.

Sp. 13. *Myrmica* (?) *lævigata*, sp. nov.

Operaria.—Rufo-testacea, lævis, tota nitidissima nuda; mandibulis, antennis, pedum articulationibus tarsisque pallescentibus; nodo primo angusto; metathoracis spinis minutissimis.

Worker.—Rufo-testaceous; the mandibles, antennæ, joints of the legs, and the tarsi, pale testaceous; head highly polished, smooth and shining; antennæ 12-jointed, the scape as long as the head, the flagellum of about the same length: the scape most slender at its base; the three apical joints of the flagellum elongate, forming an elongate club, the apex acute; the three apical joints half the length of the flagellum. Thorax: smooth and shining, forming a sort of neck anteriorly, behind which it is dilated and rounded at the sides; above convex, smooth and shining; beyond the dilatation it is elongate, the sides being parallel, the apex of the metathorax truncate and delicately reticulated, the spines very minute; the nodes smooth and shining, the first petiolated; the second widest and globose; abdomen ovate, smooth, and shining; the legs elongate.

I captured this insect some years ago at Battersea; it differs so materially in form from the rest of the genus, that it is placed here with some hesitation and a suspicion that it may prove to be the female of *Stenamma*, but having only the single specimen described, I am unable to examine the parts of the mouth as satisfactorily as I could wish and leave it to be determined by some more fortunate student of this interesting group.

Sp. 14. *Myrmica domestica.*

Fœmina.—Pallide testacea, thoracis macula antica, scutello abdomineque fusco-nigris, basi solum pallido; clava flagelli triarticulata, metathorace mutico.

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Operaria.—Pallide flavo-testacea, lævis; abdomine nitido, apice fuscescente.

Mas.—Fusco-testaceus, nitidus; antennis pedibusque pallide testaceis, antennis 13-articulatis; metathorace inermi; alis albo-hyalinis.

Myrmica domestica, Shuck. Ann. Mag. Nat. Hist., p. 626, (1838) ☿; Bostock, Trans. Ent. Soc. Lond., ii. 65; Smith, Cat. Brit. Hym. Append., p. 119, ♀, ♂; Daniell, Proc. Linn. Soc. ii. p. 172; Curtis, Trans. Linn. Soc., xxi. 217, 13.

Female.—Length 1¾ lines. Pale rufo-testaceous, the antennæ apparently 12-jointed; a minute black stain behind the anterior ocellus, and a similar one within each of the lateral ones, the stains touching the ocelli. Thorax elongate-ovate, having anteriorly a central elongate stain, a smaller one on each side, and the scutellum behind, fuscous; the legs very slender, and pale rufo-testaceous as well as the tips of the femora. Abdomen fusco-testaceous: ovate, smooth and shining; the base pale, also the apical margins of the two, or sometimes three, following segments.

Worker.—Pale reddish yellow: the apex and sides of the abdomen more or less fusco-testaceous, the antennæ 12-jointed; the head and thorax sub-opaque, the abdomen smooth and shining; the metathorax without spines; the thorax strangulated at the junction of the meta- and mesothorax.

Male.—Length 1 line. Fusco-testaceous: the head usually darkest, very delicately roughened and sub-opaque; ocelli prominent: the antennæ and legs pale testaceous; the scape slightly fuscous, sometimes only towards the base, the antennæ covered with very short pubescence. Thorax: very closely and very delicately punctured; the wings hyaline, the metathorax not spined. Abdomen ovate, smooth and shining; the scutellum is very convex, and the metathorax has a central longitudinal impressed line.

I have included this species amongst our indigenous insects, it having apparently become quite naturalized, but I have very strong reasons to believe that it was introduced. I resided in a house where this little pest had taken up its abode. The *Formicarium* was in the kitchen beneath the hearth, from thence up to the top of the house was a continuous line of ants constantly passing in opposite directions; the line became less multitudinous as it extended up-

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Genus Stenamma, Steph.

Basal joint of the antennæ long; abdominal peduncle 2-jointed, the first petiolate; antennæ 13-jointed; maxillary palpi 4-jointed, labial palpi 3 jointed; mandibles broad, oblique and 5-dentate.

Sp. 1. *Stenamma Westwoodii.*

Mas.—Pallido-fuscus, nitidus; antennis, partibus oris, tarsis, pedum articulationibus pallide testaceis; alis hyalinis, nervis testaceis; metathorace sub-dentiforme.

Stenamma Westwoodii, Steph. Syst. Cat., p. 356, 48, 38; Westw. Intro. Class. Ins., ii. 226, tab. 86, fig. 11, and details.

Male.—Length 1½ lin. Fusco-testaceous; the antennæ, tarsi and articulations of the legs pale testaceous; the head and thorax finely rugose above; the eyes and ocelli prominent, the latter of a glassy brightness: the neuration of the wings as in *M. unifasciata*, the metathorax emarginate its entire length, the lateral angles acute and prominent, scarcely dentate. Abdomen: oblong-ovate, smooth and shining, the extreme apex pale testaceous; the petiole elongate; the first segment pear-shaped; the second subglobose, wider than the first, and smooth and shining.

I have great doubts whether this insect possesses sufficient generic distinctive differences to entitle it to a separation from the genus *Myrmica*. I do not possess a specimen, and therefore cannot examine, as I could wish, *all parts of the insect;* but the only character in which it appears to differ from *Myrmica* is in having 3-jointed labial palpi. An examination of the parts of the mouth of several males proves the relative proportions of the joints to be various, and in *M. unifasciata* the basal joint is so small, or altogether wanting, that I cannot detect it; I think this male may possibly prove to be that of *M. lævigata.*

Sp. 2. *Stenamma albipennis.*

Stenamma albipennis, Curtis, Trans. Linn. Soc., xxi., 217, 15, ♂ & ☿.

I do not know this species; Mr. Curtis gives the locality of Folkestone, near Dover.

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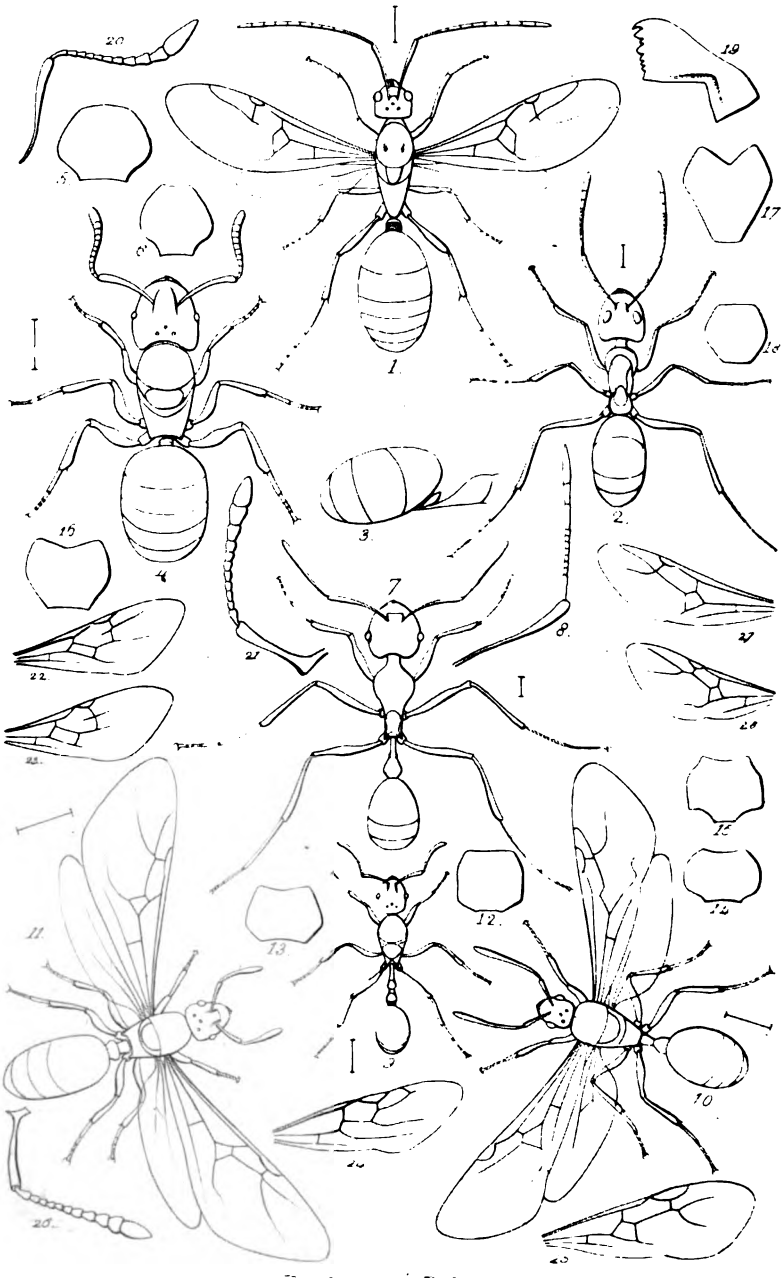

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DESCRIPTION OF PLATE IX.

Fig. 1. *Tapinoma erratica.* Male.
2. *Tapinoma lævigata.* Worker.
3. Profile of the abdomen of the same, showing the decumbent scale, and the metathorax.
4. *Formica umbrata.* Female.
5. Abdominal scale of *Formica umbrata.* Female.
6. Abdominal scale of *Formica umbrata.* Worker.
7. *Myrmica lævigata.* Worker.
8. Antennæ of *Myrmica lævigata.* Worker.
9. *Myrmica graminicola.* Female.
10. *Myrmica cæspitum.* Male.
11. *Myrmica cæspitum.* Female.
12. Abdominal scale of *Formica sanguinea.* Male.
13. Abdominal scale of *Formica rufa.* Male.
14. Abdominal scale of *F. cunicularia.* Male.
15. Abdominal scale of *F. fusca.* Male.
16. Abdominal scale of *F. nigra.* Female.
17. Abdominal scale of *F. flava.* Female.
18. Abdominal scale of *F. flava.* Worker.
19. Mandible of *F. rufa.* Worker.
20. Antennæ of *Myrmica ruginodis.* Worker.
21. Antennæ of *M. scabrinodis.* Worker.
22. Wing of *Myrmica lævinodis.* Female.
23. Wing of *M. scabrinodis.* Female.
24. Wing of *Myrmecina Latreillii.* Female.
25. Wing of *Stenamma Westwoodii.*
26. Antennæ of *Myrmica identicornis.*
27. Wing of *Formica nigra.* Female.
28. Wing of *Formica flava.* Female.

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XVI. *British Species of the Genus* Stenus. *By* Messrs. G. R. Waterhouse and E. W. Janson.

[Read 1st January, 1855.]

In the paper which we have now the honour of laying before the meeting, we originally proposed to furnish a list of the British species of the genus *Stenus*, as identified with the descriptions in Erichson's "*Genera et Species Staphylinorum*," but subsequently we thought it desirable to append to the last our determination of the species of *Stenus* contained in the collection of the late Mr. J. F. Stephens as well as in that of the Rev. W. Kirby.

To render the list as perfect as possible, we have been kindly assisted by the loan of the entire collection of *Stenidæ* of several of our most assiduous Entomologists, and we have especially to thank Messrs. Wollaston, J. Curtis, and S. Stevens for such assistance.

With regard to the Stephensian collection (now in the British Museum), it is desirable to state, that the specimens which Mr. Stephens used to call his "*Type specimens*" are almost always marked by some kind of ticket attached to the pin holding the insect. The Marshamian specimens are thus marked by a round yellow ticket; and when the species is described in the "*Entomologia Britannica*," a number will be found on the under side of the ticket, corresponding to the number of the species in that work. Other type specimens are either marked by a round white ticket without a number, or by a small square ticket with a number. Mr. Stephens' own species are not marked. The species follow in succession, in the cabinet, in accordance with the descriptions in the "*Illustrations*," but in one or two instances there have undoubtedly been some accidental transpositions; and to prevent further changes of this nature, all the species, and indeed nearly all the specimens, have now been numbered to correspond with the numbers of the species as given in the "Manual." The numbers here alluded to are on small oval tickets attached to the specimens, and it is to these numbered specimens that we more particularly refer in the notes which are contained in this communication.

The paper is divided into two parts: the first containing a list

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of all the British species which have come under our observation, with a notice of the localities in which they were found, the species being determined from Erichson's descriptions. The second portion of the paper consists of observations upon the Kirbyan and Stephensian species.

Sp. 1. *Stenus biguttatus*, Linn.

Whittlesea Mere; Shenton, Leicestershire; Tintern, Monmouthshire; Northampton; Wales; and Lincoln—T. V. W.* Highgate—G. R. W.† Finchley, Middlesex, beneath dead leaves in the dry bed of a rivulet, end of August—E. W. J.‡

Sp. 2. *Stenus bipunctatus*, Erichs.

Whittlesea Mere; Shenton; Knaith, and Scawby, Lincolnshire; Cransley, Northamptonshire; Wales, and South Ferriby on the Banks of the Humber—T. V. W. Highgate Ponds and Wandsworth Common—G. R. W. Croydon Canal; May-water Meadows; Wilton and Nayes Park; Blackgang Chine—J. C.§ Borders of the Brent, near Kingsbury, Middlesex, August; Wanstead, Essex, August; Chalk-pit, Charlton, Kent, May—E. W. J.

Sp. 3. *Stenus guttula*, Müller.

Luccomb Chine, Isle of Wight, and Highgate—G. R. W. Banks of the Lea, Tottenham, March—E. W. J.

Sp. 4. *Stenus bimaculatus*, Gyll.

In moss, in the month of March; and under bundles of reeds, in the month of May; marshes, Suffolk—J. C. Cransley; on the banks of the Ouse, Bedfordshire; Ambion Wood, Leicestershire; Cainby and Spridlington, Lincolnshire; and Rosnalee, county of Cork—T. V. W. Berwickshire, (Mr. J. Hardy); Finchley, July—E. W. J.

Sp. 5. *Stenus Juno*, Fab.

Shenton and Boston, Lincolnshire; Cransley; Slapton Ley, Devonshire; Whittesea Mere; Box-hill, Dorking; Norwich and Lowestoft—T. V. W. Neighbourhood of London, common—

* Mr. T. Vernon Wollaston.
† Mr. G. R. Waterhouse.
‡ Mr. E. W. Janson.
§ Mr. John Curtis.

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G. R. W.* "Weston-on-the-Green, Oxfordshire, Mr. Matthews." —J. C. Berwickshire (Mr. J. Hardy); Northampton (Mr. R. N. Greville); banks of the Lea at Tottenham, March—E. W. J.

Sp. 6. *Stenus asphaltinus*, Erichs.

Chalk-pit, Greenhithe, Kent—G. R. W. Chalk-pit, Charlton, May—E. W. J.

Sp. 7. *Stenus ater*, Mann.

Greenhithe, in the month of June—G. R. W.

Sp. 8. *Stenus buphthalmus*, Grav.

Highgate and Wandsworth Common—G. R. W. Bedfordshire, on the banks of the Ouse; Whittlesea Mere; Withington, Cotswold Hills, Gloucestershire; Boston; Slapton Ley; Holyhead; Slayford Bridge, Hampshire; Kelham, Northamptonshire, banks of the Trent; and Killarny, Ireland—T V. W. Wilton, Wiltshire—J. C. Banks of the Lea, near Tottenham, March; Colney-hatch, March; Northampton (Mr. R. N. Greville)—E. W. J.

Sp. 9. *Stenus morio*, Erichs.?

A single specimen taken running on the muddy bottom of a water-course, in a wood near Highgate, on the 28th of August, 1854—E. W. J.

Sp. 10. *Stenus cinerascens*, Erichs.?

See notes upon species 9 and 10 in the portion of the paper which relates to the Kirbian species.

Sp. 11. *Stenus incrassatus*, Erichs.

Wandsworth Common, June; Wimbledon Common, from moss in the winter—G. R. W.

Sp. 12. *Stenus melanopus*, Marsham.

Highgate—G. W. R. Deal; Bassel Down, Wilts; and Boston —T. V. W. Potter's Bridge, near Southwold, Suffolk—J. C. Banks of the Brent, near Kingsbury, August; Hampstead, June; Finchley, July—E. W. J.

* This, as well as the *Stenus speculator*, is tolerably common in the court in front of the British Museum, where many *Coleoptera* are found by my children.—G. R. W.

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Sp. 13. *Stenus æmulus*, Erichs.

Whittlesea Mere—T. V. W.

Sp. 14. *Stenus canaliculatus*, Gyll.

Highgate, July—G. R. W. Deal; Fleetwood, Lancashire; Whittlesea Mere; Boston; Slapton Ley; Holyhead; Lowestoft; Headley—T. V. W. Horning, Norfolk—J. C. Banks of the Brent, near Kingsbury, September; Northampton (Mr. R. N. Greville)—E. W. J.

Sp. 15. *Stenus opacus*, Erichs.

Two specimens in Mr. Waterhouse's collection, which he has reason to believe are from Northumberland.

Sp. 16. *Stenus pusillus*, Erichs.

Highgate—G. R. W. Bedfordshire; Ferriby; Cransley; and Deal—T. V. W. Downham, Norfolk—J. C. Northampton (Mr. R. N. Greville)—E. W. J.

Sp. 17. *Stenus exiguus*, Erichs.

Spridlington, Lincolnshire; and Rosnalee, county of Cork—T. V. W.

Sp. 18. *Stenus speculator*, Erichs.

Common in the neighbourhood of London—G. R. W. Rosnalee, county of Cork; Treneglos, Cornwall; Spridlington; Cransley; Mablethorpe, coast of Lincolnshire; Dublin; Pencraig, S. of Anglesea; Southend—T. V. W. Suffolk; Norfolk; and Wiltshire—J. C. Berwickshire (Mr. J. Hardy); Northampton (Mr. R. N. Greville); copiously throughout the year at Colneyhatch, Finchley, &c.—E. W. J.

Sp. 19. *Stenus providus*, Erichs.

Whittlesea Mere; Isle of Wight; and Cransley—T. V. W. Colneyhatch and Finchley, among moss, late in the autumn and in winter—E. W. J. From moss, January, Wimbledon Common—G. R. W.

Sp. 20. *Stenus argus*, Grav.

Spridlington—T. V. W.

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Sp. 21. *Stenus vafellus*, Erichs.

Spridlington; and Killarny—T. V. W.

Sp. 22. *Stenus fuscipes*, Grav.

Neighbourhood of London—G. R. W. Killarny, Ireland—T. V. W. Northampton (Mr. R. N. Greville)—E. W. J.

Sp. 23. *Stenus circularis*, Grav.

Downham, Norfolk—J. C.

Sp. 24. *Stenus declaratus*, Erichs.

In moss, Hampstead Heath—G. R. W. Withington, Gloucestershire; Trebartha, Cornwall; Chepstow and Tintern, Monmouthshire; Holyhead; Killarney; and Rosnalee—T. V. W. In moss, Finchley, November; Northampton (Mr. R. N. Greville)—E. W. J.

Sp. 25. *Stenus nigritulus*, Gyll.

Dover; Bedfordshire; Tintern; and Mablethorpe—T. V. W. Cosmore Quay, Dorsetshire—J. C.

Sp. 26. *Stenus campestris*, Erichs.

Neighbourhood of London?—G. R. W.

Sp. 27. *Stenus unicolor*, Erichs.

Common in the neighbourhood of London; in moss, in the month of December; Hampstead Heath—G. R. W. Tintern; Flamborough, Yorkshire; Spridlington; Whittlesea Mere; Holyhead; Rosnalee; and South Ferriby—T. V. W. Petersfield, Hants; and Glanvilles Wootton—J. C. Highgate, Colney-hatch; Finchley; in moss in the winter—E. W. J.

Sp. 28. *Stenus binotatus*, Ljungh.

Neighbourhood of London—G. R. W. Holyhead—T. V. W. Tollesburs, Essex—J. C.

Sp. 29. *Stenus subimpressus*, Erichs.

Dartford, Kent—G. R. W. Whittlesea Mere and Lincoln—T. V. W. Banks of the Lea, near Tottenham, March; Northampton (Mr. R. N. Greville)—E. W. J.

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Sp. 30. *Stenus plantaris*, Erichs.

Whittlesea Mere; and Slapton Ley—T. V. W. Northampton (Mr. R. N. Greville)—E. W. J.

Sp. 31. *Stenus plancus*, Erichs.

Roots of trees, in the winter; Christchurch Meadows, Oxford —J. C. Colneyhatch, in moss, February; Wanstead, in moss, March; Finchley, not uncommon in the autumn—E. W. J.

Sp. 32. *Stenus bifoveolatus*, Erichs.

Sp. 33. *Stenus rusticus*, Erichs.

Cransley; Avebury, Wilts; Withington; Spridlington; South Ferriby; Mona, near Pencraig, S. of Anglesea; Northampton; Danes Dyke, Flamborough; Holyhead; Ambion Wood, Leicestershire; Killarny and Rosnalee—T. V. W. Colneyhatch and Finchley, in moss, late in the autumn—E W. J.

Sp. 34. *Stenus tempestivus*, Erichs.

Shenton; Whittlesea Mere; Ferriby; Treneglos, and Rosnalee—T. V. W. Berwickshire (Mr. J. Hardy); Northampton (Mr. R. N. Greville)—E. W. J.

Sp. 35. *Stenus subæneus*, Erichs.

Northampton—T. V. W. Mickleham—J. C. Chalk-pit, Charlton, May; Renfrew (Mr. J. Scott); Shanklin, Isle of Wight, in moss (Mr. G. Guyon)—E. W. J.

Sp. 36. *Stenus picipes*, Stephens.
palustris, Erichson, var. ?

Whittlesea Mere; Spridlington; and Rosnalee—T. V. W. Finchley, July and August—E. W. J.

Sp. 37. *Stenus impressus*, Germ.

Glanvilles Wootton—J. C. Trebartha; Withington; Mona; Spridlington; Deal; Scawby; Mablethorpe; Slayford-bridge, Hampshire; Ambion Wood; Holyhead; Rosnalee; and Killarny —T. V. W. Isle of Wight—G. R. W. Highgate, in moss, January; Hampstead; Finchley, in spring and autumn—E. W. J.

Sp. 38. *Stenus geniculatus*, Grav.

Slayford Bridge, Hampshire—T. V. W.

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Sp. 39. *Stenus flavipes*, Erichs.

Colneyhatch; Finchley, in moss, in winter and early spring; Shanklin, Isle of Wight, in moss (Mr. G. Guyon)—E. W. J.

Sp. 40. *Stenus fuscicornis*, Erichs.

Greenhithe, Kent—G. R. W.

Sp. 41. *Stenus pallipes*, Grav.

Colneyhatch, in moss, January; Finchley, September—E. W. J.

Sp. 42. *Stenus filum*, Grav.

Isle of Wight—G. R. W. Cotswold Hills, Gloucestershire; Spridlington; Bridlington, Yorkshire; Treneglos; Cransley; Ferriby; Ambion Wood—T. V. W. Hampshire and Dorsetshire —J. C. Water Down, near Tonbridge Wells (Rev. J. F. Dawson); Shanklin, Isle of Wight, in moss (Mr. G. Guyon)—E. W. J.

Sp. 43. *Stenus tarsalis*, Ljungh.

Common in the neighbourhood of London—G. R. W. Bedfordshire; Tintern; Cransley; Northampton; Llangollen; North Wales; Killarny—T. V. W. Glanvilles Wootton—J. C. Wanstead, in moss, March; Northampton (Mr. R. N. Greville)—E. W. J.

Sp. 44. *Stenus oculutus*, Grav.

Hampstead Heath, in moss, December—G. R. W. Bridlington; Mablethorpe; Spridlington; Headley; Rosnalee, and Killarny—T. V. W. Dover; Dorset, and Suffolk — J. C. Finchley, abundant in spring and autumn; Shanklin, Isle of Wight (Mr. G. Guyon)—E. W. J.

Sp. 45. *Stenus cicindeloides*, Grav.

Neighbourhood of London—G. R. W. Whittlesea Mere—T. V. W. Battersea Fields, June; Shanklin, Isle of Wight, in moss (Mr. G. Guyon)—E. W. J.

Sp. 46. *Stenus paganus*, Erichs.

Epping Forest—J. C. North Wales; Trebartha; and Rosnalee—T. V. W.

Sp. 47. *Stenus latifrons*, Erichs.

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Sp. 48. *Stenus contractus*, Erichs.
basalis, Curtis.
fornicatus, Kirby's collection.
New Forest—J. C. Colneyhatch, in moss, February—E. W. J.

Notes on the Species of Stenus *described by Kirby; and, in the "Illustrations of British Entomology," by Mr. Stephens; together with Observations upon the Specimens in Mr. Stephens' Collection.*

Dr. J. E. Gray, the present possessor of the Kirbyan Manuscripts on the *Staphylinidæ*, having kindly lent one of us the three volumes in which they are contained, we will venture to say a word or two respecting them, before we proceed to the immediate object of the present communication. The descriptions are each written on separate slips of paper; * and the number of genera and species, described with considerable detail, is about six hundred, or rather more, these comprising the greater portion of the British *Staphylinidæ*, together with some Continental species (often from Swedish specimens sent by Gyllenhal) and some exotic. The generic characters are given in great detail, and not unfrequently accompanied with drawings of parts of the mouth, &c. As regards the descriptions of the British species, they were drawn up from the specimens in the author's own collection, and those of several other cabinets; those most frequently referred to are the cabinets of Mr. Spence, Dr. Leach (now in the British Museum), Messrs. Sheppard, Marsham and Simpson, and Dr. Joseph Hooker. Mr. Wilkin's collection is also referred to. This last mentioned collection became the property of Mr. Vigors, and was presented by him, together with his collections in other branches of Natural History, to the Zoological Society. In it will be found a tolerably good series of British *Staphylinidæ*, with Kirby's names attached, and there are good grounds for believing that many of them were examined and named by Kirby.†

* Evidently early in the present century.

† It appears by notes attached to some of the species of *Stenus*, that Mr. Wilkin was not satisfied, in all cases, with the names furnished him by Kirby. Of the species named *angustatus* there are three or four specimens, one of which has

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With regard to Mr. Stephens' collection, it is desirable that it should be known that Mr. Stephens visited Mr. Kirby, and took with him a large number of insects to compare and name, the *Stenidæ* amongst others: further, one of us was informed, by Mr. Stephens, that Kirby furnished him, in many instances, with specimens. The Stephensian collection will therefore furnish a certain amount of assistance to those who are anxious to determine the Kirbyan species; there are, however, several instances in which the insects, placed to represent the Kirbyan species, differ widely from the Kirbyan types.* Should the foot note at p. 99, vol. v. "Mandibulata," of Mr. Stephens' work, have been overlooked, it will be asked, why not regard the *Staphylinidæ*, in Mr. Stephens' collection, as the true types of the species whose names they bear? The answer is contained in the note referred to.

The descriptions in the "Illustrations," so far as the Kirbian species of *Staphylinidæ* are concerned, are in fact translations of Kirby's Latin descriptions, often somewhat abbreviated. That they are abbreviated is to be regretted, and this regret was shared by Mr. Stephens. "*I greatly fear*," *says the author*, "*that notwithstanding the elaborate descriptions, I shall fall into error in my attempted abridgment of them in order to suit the limits of this work, as I have not sufficient time to investigate them*," i. e. the species of *Staphylinidæ*.

Having consulted the manuscripts alluded to, and also having carefully examined the *Steni* in the collections of Kirby, Leach, Wilkin and Stephens, we will now furnish the determination which we have arrived at from these sources, taking the species and sections as they stand in the Kirbian manuscripts.

been separated from the rest, and has the following note attached:—"Named *angustatus*, K., quite distinct, not so long and narrow, and smooth." Another specimen, named *binotatus*, is separated from that species as being "less punctured" and having the "tarsi flavescent." Wilkin applies the name *flavitarsis* to this insect; the *species* had, however, been previously named *pallitarsis* by Kirby, and is described by Erichson under the name *plantaris*. Stephens gives it in the "Manual" as var. ? *tarsalis*. It has the abdomen margined, and therefore cannot be *tarsalis*.

* The extremely liberal manner in which Mr. Stephens threw open his collections to all Entomologists who wished to consult them is well known. Often on Mr. Stephens' "Wednesday Evenings" many Entomologists were assembled, each one of whom was engaged in comparing his specimens with those in Mr. Stephens' collection. Minute species were necessarily removed from the cabinet for this purpose, and it will be pretty evident, under such circumstances, that transposition of the specimens will sometimes have occurred.

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Section 1 (* of the manuscript).
Elytra with a pale spot.

Sp. 1 (1). ***binotatus***, Kirby, MSS.
Stephens' Illustrations, Mandibulata, vol. v. (1833).
bimaculosus, Steph. Manual.

Unquestionably introduced by Mr. Stephens, by mistake, as a British insect; his collection does not possess the species, and the notices of its habitats must refer to some other insect. *St. binotatus* of Kirby's MSS. (from which Mr. Stephens' account is taken, with the exception of the localities) is founded upon a single specimen seen in the cabinet of Mr. Lee, the habitat of which was not known, but Kirby seems to have felt no doubt it was a foreign insect, for he includes it in his list of "*Foreign Staphylini*," which will be found near the end of his MS. Catalogue, now in the Library of the Entomological Society.

Sp. 2 (2). ***cærulescens***, Kirby, MSS.
Dianous cærulescens, Stephens, Curtis, Erichs. &c.

Described in the MSS. from Swedish specimens furnished by Gyllenhal; a subsequently added note states that the species had been found at Hastings, by Dr. Hooker.

Sp. 3 (3). ***biguttatus***, Kirby, MSS., and also of his Collection.
Stephens' Illustr.
Erichs.
Staphylinus bipustulatus, Marsham, according to the type specimen in Stephens' Collection.
Sten. bipustulatus, Steph. Collection.

Sp. 4 (4). ***bipustulatus***, Kirby, MSS. and Collection.
Steph. Illustr.
biguttatus, Steph. Coll.
bipunctatus, Erichs.

The basal joint of the palpi is testaceous in Kirby's specimens, and the second and third joints are black; the palpi are therefore not wholly black, as stated in the description. The trochanters are pitchy black. In the *Stenus biguttatus* of Kirby's Collection the palpi have the first joint, and half the second, pale, and the remainder dusky: it is the more slender and delicately made species, with a smaller spot on the elytra, and that rather nearer the suture than in Kirby's *bipustulatus*.

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Sp. 5 (5).† *Juno*, Kirby, MSS., in Index of the Species.
biguttulus, in the text.‡
bimaculatus, Steph.
Erichs.

Sp. 6 (6). *bipunctatus*, Kirby, MSS. and Collection.
guttula, Steph. Erichs.
Kirbyi (Leach), Steph., and of Leach's Collection.
Gyllenhal.

Section 2 (* *, *a* 1, Kirby). ***Abdomen margined, legs pale.***

Sp. 7 (1). *brevis*, Kirby, MSS. and Collection.
of Wilkin's Collection.
circularis, Erichs.
Steph. Illustr. (the description from Kirby), not of Collection.
immunis, Steph. Coll.

Sp. 8 (2). *flavipes*, Kirby, MSS.
Steph. Illust. and Coll.
pallipes, Grav.? Kirby, MSS.
Leach, Coll., Kirby, Coll.
filum, Erichs.

Sp. 9 (3). *immunis*, Kirby, MSS. and Collection.
Steph. Illustr. (not Coll.)
pallipes, Erichs.

Sp. 10 (4). *aceris*, Kirby, MSS. and Collection.
Steph. Illustr. and Collection.
Leach, Coll.
Wilkin's Coll.

† The numbers in brackets correspond with those on the insects in Kirby's Collection, and also with the numbering of the species in the MSS.

‡ Each section of the *Steni* is preceded in the MSS. by a slip bearing the names of the species which it contains, but sometimes the names in the Index do not correspond with those heading the descriptions, for it appears that at some subsequent period particular species were identified by Kirby with the descriptions published by other authors. Thus, in the present instance, we find added to other synonyms (and subsequently inserted), "*St. Juno*, Grav."—the name adopted in the Index. It may here be stated, that the numbering of the species recommences with each section, and hence, in consulting Kirby's Collection (the specimens in which are numbered to correspond with this MSS.), it is highly important that the sectional characters of the specimens be attended to.

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subrugosus, Steph. Coll., also *St. tenuicornis*, of Steph. Collection, but his description seems to belong to *St. subæneus*, Er.
impressus, Erichs.
St. fuscipes of Steph. Collection is the same, but does not agree with the description.

Sp. 11 (5). *gonymelas*, Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Leach, Coll.
geniculatus, Steph.
subæneus, Erichs.

Sp. 12 (6). *canaliculatus*, Kirby, MSS., and Coll.
Steph. Illustr. and Coll.
Wilkin's Coll.
clavicornis, Steph. Coll.
punctatissimus, Steph. Coll.
speculator, Erichs.

Sp. 13 (7). *nigricornis*, Kirby, MSS. and Coll.
Steph. Illust. and Coll.
Leach, Coll.
boops, Steph. Collect., also *St. atricornis* of the same.
speculator, Erichs.

Sp. 14 (8). *nitidiusculus*, Kirby, MSS. and Coll.
Steph. Illustr. (not Coll.)
Leach, Coll.
juncorum (Leach), Stephens.
tempestivus, Erichs.
St. nitidiusculus of Stephens' Collection is *speculator*, Er.

Sp. 15 (9). *picipes*, Kirby, MSS. and Collection.
Steph. Illustr. (not of the Collection.)
rusticus, Erichs.
The *St. picipes* of Stephens' Collection is referred to in the account of *St. ossium*, No. 17.

Sp. 16 (10). *phæopus*, Kirby, MSS. and Coll.
Steph. Illustr. (not the Coll.)
bifoveolatus (Gyll.), Erichs.
St. phæopus of Stephens' Collection is *St. rusticus*, Er.

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Sp. 17 (11). *Ste. ossium*, Kirby, MSS. and Collection.
palustris, Erichs.?

We have before us three specimens of *Stenus* differing more or less, but which agree in having a slight bronze tint, in having the legs more or less pale, with dark knees; the thorax with a broadish shallow dorsal channel and two depressions behind; the tarsi elongate, slender, and with the fourth joint strongly bilobed. Two of these agree in having the two basal joints, and the apex of the antennæ, black (or nearly so), and the intermediate joints pitchy testaceous. One of these has rather coarse and somewhat scattered punctures on the abdomen; this we take to be the *St. subæneus* of Erichson, and it is certainly the *St. gonymelas* of Kirby. The second of these two differs from *gonymelas* in having the abdomen very finely and thickly punctured, and the puncturing, both of the thorax and elytra, less coarse. It stands as *St. picipes*, *St. bifoveolatus* and *St. ossium* in Stephens' Collection. In both these insects the femora have the basal half testaceous, and the apical half black; the tibiæ and tarsi pitchy, or pitchy-testaceous. We believe these to be good species, having examined very many specimens; both are common in England.

The third insect is the true *St. ossium* of Kirby's Description, and of his Collection. Whilst *St. gonymelas* is rather the largest of the three insects under consideration, this is decidedly the smallest, being equal to *St. pallipes*.* Here the antennæ are testaceous, with the apex dusky, the basal joint black, and the second joint very slightly tinted with piceous on the upper surface; the tibiæ are pale, excepting at the base, and the tarsi are for the most part pale also. Besides these points we can perceive no difference between this insect and that which Stephens calls *picipes*. Further, it appears to us that the *Stenus ossium* of Kirby must be the same as the *St. palustris* of Erichson. We doubt whether *St. ossium*, and the so-called *St. picipes*, be distinct, but having seen a single specimen only presenting the peculiarities of the former, we must leave the question open.

Sp. 18 (12). *sulcicollis*, Kirby, MSS.

In Kirby's MSS. there is no full description of this species, all that is given being the short Latin diagnosis, which precedes the description in Mr. Stephens' work, with this exception, that, in the

* The shorter thorax and elytra and the more coarse sculpturing of these parts, as well as the entirely pale legs in *pallipes*, will prevent the *St. ossium* being confounded with it.

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original, the last phrase is " pedibus piceis," not " *rufo*-piceis," as in the " Illustrations." The detailed description in this work is possibly from a small specimen of *St. subæneus*, Er. The insect in Mr. Stephens' cabinet which stands for *sulcicollis* evidently is misplaced by a black-legged species, i. e. *St. melanopus*, of Marsham.

Sp. 19 (13). *submarginatus*, Kirby, MSS. and Coll.
Steph. Illustr. (not of Coll.)
vafellus, Erichs.
St. submarginatus of Steph. Coll. is *St. rusticus*, Er.

Section 3 (** *a* 2). *Abdomen margined, legs black.*

Sp. 20 (1). *lineatulus*, Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Leach's Coll.
buphthalmus (Gyll.), Steph. Coll.
Juno, Erichs., Steph.

Sp. 21 (2). *pubescens*, Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Leach, Coll.
lævis, Steph. Illustr. and Coll.
lævior, Wilkin's Coll.
Steph. Coll.
subimpressus, Erichs.

According to the MSS., Kirby first imposed the name *læviusculus*; this was afterwards altered to *lævior*, and ultimately to *pubescens*. He does not make two species, as would appear from the descriptions in the " *Illustrations*."

Sp. 22 (3). *pilosulus*, Kirby, MSS. and Coll.
Steph. Illustr. (not Coll.)
binotatus, Erichs.
affinis, Steph. Coll.
pilosulus, of Stephens' Collection, is *rusticus* of Erichson.

Sp. 23 (4). *argenteus*, Kirby, a Swedish insect, received from Gyllenhal.

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Sp. 24 (5). *affinis*, Kirby, MSS. and Coll.
Wilkin's Coll.
Steph. Illustr. (not Coll.)
Canaliculatus, Erichs.
St. affinis of Stephens' Collection is *St. binotatus* of Erichs.

Sp. 25 (6). *angustatus*, Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Wilkins, Coll.
buphthalmus, Erichs.

Sp. 26 (7). *melanarius*, Kirby, MSS. and Coll.
Steph. Illustr. (not the Coll.)
cinerascens, Erichs. ?

Stenus melanarius, Kirby.

Black, sparingly clothed with whitish pubescence; thorax and elytra but little glossy; abdomen glossy. Head thickly punctured, about one-third broader than the thorax, the frontal sulci moderately impressed, and separated by an evenly convex space; antennæ with the third and fourth joints nearly equal (the third rather the longer); palpi black, with the basal joint testaceous. Thorax subcylindrical, the sides gently rounded, and the broadest part rather in front of the middle; thickly punctured, the interspaces between the punctures very narrow, but for the most part flat; a slight transverse depression near the front, and the base obscurely depressed, and somewhat rugulose in the middle. Elytra rather small, but little longer than the thorax; rather thickly but not strongly punctured, the interspaces flat, depressed at the suture, and with an oblong depression between this part and the shoulder; these parts scarcely torulose. Abdomen considerably elongated, and narrow; but little convex, and with fine, and somewhat widely scattered, punctures. Tarsi rather short.

Amongst the British species this approaches most nearly in size and general appearance to the *St. buphthalmus*, Er., but it has a narrower thorax, and the sides of this segment are not so much dilated; the elytra are less strongly punctured (not rugulose), and the middle basal depression, as well as the sutural one, are more marked; the punctures on the abdomen are less strong, and less numerous. The head, moreover, is rather narrower, and the frontal ridge is rather less strongly marked than in *St. buphthalmus*.

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Of the species described by Erichson there are two, which in their general characters must approach very nearly to Kirby's *St. melanarius*; we allude to the *St. incanus* and *St. cinerascens*, in both of which the elytra are but little longer than the thorax, and the abdomen sparingly and finely punctured. The first, however, is said to have the forehead deeply bisulcate; the elytra longitudinally torulose, and the basal joint of the palpi piceous—points which do not accord with Kirby's insect. On the whole, the description of *St. cinerascens* agrees so nearly with Kirby's insect, that we suspect we might safely remove the note of doubt after that name, given as a synonym; the phrase "*Caput thorace paulo latius, coleopteris dimidio angustius*," however, seems to imply that the head is rather narrower, and the elytra somewhat broader, in *cinerascens* than in *melanarius*.

We have seen but one specimen of the *St. melanarius*—that in the Kirbian Collection.

The insect which stands as *melanarius*, Kirby, in Stephens' Collection, is the *St. unicolor* of Erichson, and does not agree with the description given in the "Illustrations."

We will here notice a nearly allied species,* which we think will prove to be the *St. morio*, Erichs.

It has the elytra more ample and the abdomen more thickly punctured than the *St. melanarius*, and differs, moreover, in the forehead being somewhat concave. This last-mentioned character will likewise serve to separate it from the *St. canaliculatus*, Er., as well as the absence of the dorsal channel to the thorax. The thorax itself is rather narrower, and this part, as well as the elytra, are a little less thickly punctured. In other respects, it much resembles the *St. canaliculatus*.

Sp. 27 (8). *melanopus*, Kirby, MSS. and Collection.
Steph. Illustr. and Coll.
Wilkin's Coll.
Staph. melanopus, Marsham, according to the type specimen in Stephens' Coll.

Niger, nitidus, albido-pubescens, parcius punctatus, interstitiis planis; fronte profunde bisulcato; palpis articulo primo testaceo; thorace breviusculo, breviter, at sat profunde canaliculato; elytris thorace longioribus; abdomine parcius punctulato.

Long. corp. 1½ lin.

* In the collection of Mr. Janson.

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This species is rather smaller than *St. canaliculatus*, Er., and its puncturing, though strong, is much less dense than in that, and many allied species; hence it appears more black and glossy. The short and rather strong groove on the disc of the thorax also helps to distinguish it. The head is very little broader than the thorax; the forehead deeply sulcated on either side, the convex mesial ridge well marked; antennæ moderate, with the third and fourth joints equal (or, *very* nearly so); palpi black, with the basal joint testaceous: thorax rather short, posteriorly a little narrower than in front, the sides rounded and the greatest breadth rather in front of the middle; strongly punctured and with flat interspaces between the punctures, which, for the most part, rather exceed in width the punctures themselves; a short but distinct groove on the disc, sometimes extending nearly to the base, and frequently are seen two small foveæ at the last mentioned part, not far removed from the mesial line; elytra about half as broad again as the thorax, their length and width about equal, the surface punctured like the thorax, the region of the scutellum depressed, excepting on the hinder part. Abdomen strongly margined, the surface of the segments more finely punctured than the other parts noticed, and the punctures rather more scattered. Legs moderate, the fourth joint of the tarsi simple.

A common and widely distributed insect in England, which we cannot clearly identify with either of Erichson's descriptions; it must be very close to *St. nitidus*, but the phrase relating to the antennæ, "articulo tertio quarto sesquilongiore," cannot be applied to our insect.

Sp. 28 (9). ***pusillus***, Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Leach, Coll.
Erichs.

Sp. 29 (10). ***nitidus***, Kirby, MSS. and Coll.
Steph. Illustr. (not Coll.)
Leach, Coll.
plancus, Erichs.

There is a single specimen in Mr. Stephens' Collection under the name *nitidus*; it is in bad condition, but appears to be the *St. latifrons* of Erichs.

Sp. 30 (11). ***nitens***, Kirby, MSS.
Steph. Illustr. (not the Coll.)

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Described by Kirby from an insect in Dr. Leach's Collection, which we find to be the *St. æmulus* of Erichson. The "*nitens*" of Stephens' Collection does not answer to his description: it is *St. rusticus* of Erichson.

Sp. 31 (12). *pallitarsis*, Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Leach, Coll.
flavitarsis, Wilkin's Coll. (not of Steph.)
plantaris, Erichs.

Section 4 (** *b* 1). *Abdomen immarginate, legs pale.*

Sp. 32 (1). *oculatus* (Grav.) Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Leach, Coll.
Wilkin's Coll.
Erichs.
cognatus, Steph. Illustr.

Sp. 33 (2). *cicindeloides* (Grav.), Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Leach, Coll.
Wilkin's Coll.
Erichs.
scabrior, Steph. Illustr. and Coll.

Kirby originally gave the name *scabrior* to this species; but, subsequently, finding it described under the name *cicindeloides* by Gravenhorst, he adopted the latter name.

Sp. 34 (3). *brunnipes*, Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Wilkin's Coll.
Marshami and *gracilis*, Steph. Coll.
unicolor, Erichs.

The insect which we have regarded as *St. unicolor* of Erichson has the fourth joint of the tarsi obcordate, or sub-bilobed, and in this respect does not agree strictly with the description; when compared, however, with the species which it most resembles—*St. latifrons*, Er., there is a marked difference in the tarsi, the last-mentioned insect having the fourth joint very strongly bilobed. The more distinct ridge on the head of the insect, which we regard as *unicolor*, will also help to distinguish it from *latifrons*.

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Sp. 35 (4). *fulvicornis*, Kirby, MSS.
Steph. Illustr. and Coll.; and *St. pallipes* (Grav.), Steph. Coll.
Leach, Coll.
paganus, Erichs.

The insect in Kirby's cabinet, which, according to the number it bears, should be his *St. fulvicornis*, is *St. tarsalis* of Erichson, and does not agree with Kirby's description, which is no doubt from the *St. paganus* of Erichson. In the MSS., Leach's collection is said to possess the species, and there we find the *St. paganus* named as *fulvicornis*; the same insect is similarly named in Stephens' Collection.

Sp. 36 (5). *curvipes*, Kirby, MSS.

Described from an insect in Wilkins' Collection. The specimen is in bad condition, having lost one of its elytra, as well as the abdomen: its posterior tibiæ are bowed inwards and forwards in a marked degree, but it appeared to us that they were not both quite alike, and this leads us to doubt their presenting a natural condition of the parts in question. On the whole, after a careful examination, we came to the conclusion that it was a crippled specimen of *Stenus fuscipes*, Er. This *guess* we subsequently found to accord well in one important particular with the description by Kirby, for we find the phrase "*abdomen teres submarginatum*" in the MSS.

Sp. 37 (6). *similis*, Kirby, MSS.?
Steph. Illustr. and Coll.
paganus, Erichs.

This species is merely named by Kirby in his MSS.: the description in the Illustrations is original. The insect which in Mr. Stephens' cabinet stands as *St. similis* (and which is no doubt the insect described), is the *paganus* of Erichson, whilst the *St. similis* in Kirby's Collection is the very nearly allied species, differing in having the antennæ pitchy in the middle (instead of pale testaceous), the elytra narrower, and the sculpturing rather less coarse, in fact the species which we regard as the *St. latifrons* of Erichson.*

* There is some confusion in the differential characters as pointed out by Erichson, which however is readily corrected by perusal of the descriptions.

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Section 5 (* * *b* 2). *Abdomen immarginate, legs black.*

Sp. 38 (1). *rufitarsis*, Kirby, MSS. and Coll.
Steph. Illustr. and Coll.
Leach, Coll.
tarsalis, Erichson.
Steph. Illustr. and Coll.
flavitarsis, Steph. (not Wilkin's Collection; see *pallitarsis*, K).

Sp. 39 (2). *nigriclavis*, Kirby, MSS.
Steph. Illustr. and Coll.
tarsalis, Erichs.

There are varieties of *St. tarsalis* in which the tarsi are almost black, and others in which they are pale; the former, it would appear, constitute the *St. nigriclavis* of Kirby, and the latter his *St. rufitarsis*.

Sp. 40 (3). *unicolor*, Kirby, MSS.

St. unicolor of Stephens' Collection is no doubt the same as *St. unicolor* of Erichson, but the description in the Illustrations (which is from Kirby's MSS.) gives the legs as being *black*. The true *unicolor* of Kirby is most probably the *St. campestris* of Erichson.

Sp. 41 (4) *fornicatus*, Kirby, MSS. and Collection.
Leach, Collection.
Steph. Illustr. (not of his Coll.)
contractus, Erichs.

This species was originally described from Dr. Leach's Collection. Kirby did not notice the pale spot at the base of the tibiæ of this singularly formed species.

Sp. 42 (5). *assimilis*, Kirby, MSS.

Not known to us. *St. assimilis* of Stephens' Collection is *St. unicolor*, which, however, cannot be the insect described by Kirby, nor that of the *Illustrations*.

Sp. 43 (6). *crassus*, Kirby, MSS.
Steph. Illustr. and Coll.
nigritulus, Erichs.

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Besides the Stephensian species already noticed in this list, there remains in the "*Illustrations*"—

Sp. 22. *St. argyrostoma*, Steph., which is *fuscipes*, Erichs.

Sp. 55. *St. carbonarius* (Gyll.), Steph.

With this name there are no specimens in Stephens' Collection, but in its place are two insects, viz., *fuscipes*, Erichs., and *fuscicornis*, Erichs.

Sp. 59. *nanus*, Steph. Coll.
declaratus, Erichs.

One of the specimens is *St. pusillus* of Erichson.

XVII. *Descriptions of some Species of Brazilian Ants belonging to the Genera* Pseudomyrma, Eciton *and* Myrmica (*with Observations on their Economy by Mr.* H. W. Bates). *By* Frederick Smith, Esq.

[Read January 1st, 1855.]

Genus Pseudomyrma, Guér.

Antennæ sub-clavate, 13-jointed in the females, 12-jointed in the workers, the antennæ slightly thickened towards their apex, not quite so long as the head and thorax, inserted on the anterior part of the face, near the mouth, on each side of a short elevated carina. *Mandibles* triangular, denticulated on their inner margin. *Eyes* elongate-ovate, very large, occupying a large portion of the head: ocelli three, placed in a triangle on the vertex. *Thorax* elongate, compressed at the sides; the anterior wings having one marginal and two complete submarginal cells, the second receiving the first recurrent nervure near its base; one discoidal cell; legs short and stout. *Abdomen* ovate; the first segment forming an elongate pedunculated node, the second large and globose.

The name *Pseudomyrma* is proposed for the insects comprised in this genus by Lund, in the Annales des Sciences Naturelles, 1831; but the only character there given is the extraordinary

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size of the eyes; the genus is fully characterized by Guérin in the Iconographie du Règne Animal.

The observation of the habits of these curious ants given by Lund is, that they are to be found running on the trunks and leaves of shrubs and trees; our indefatigable and observant countryman, Mr. H. W. Bates, sends me the following account of one of the species, *P. oculata:* "Its colonies I have hitherto found only in the tumuli of different species of *Termes;* in some instances I found them in spacious elliptical chambers, in the outer walls of the Termitaria; one colony to each chamber; the chambers wide apart and having no connection with each other; the number of individuals few in each colony; the pupæ are not enclosed in cocoons. In some instances I have found them with their larva and pupæ within the same chambers as the *Termes*, in different parts of the Termitarium; the workers are sometimes found in numbers, coursing rapidly over trees and herbage. Another species constructs its Formicarium in the pith tube of dried twigs, the colonies are not numerous." We may from these circumstances perceive that they are insects of varied habit, and that, like those of the genera *Formica* and *Myrmica* found in this country, some prefer to construct their habitations under ground, others in decaying trees, whilst at least one species chooses part of the same mound or tumuli, as a species of *Termite;* in the same manner we find species of *Myrmica scabrinodis* occupying one side of a little hillock, and *Formica flava* the other.

I have a very strong suspicion that some of the species described in this paper belong to the genus *Condylodon*, proposed by Lund, whilst others would fall into that of *Pseudomyrma;* the distinctions between these being merely indicated by that author in his communication to his friend Audouin; but as the species which presents the greatest disparity to the type (*P. advena*) is one of which I possess the winged female, and as I find the neuration identical with that of the typical species, I retain them all in one genus.

Sp. 1. *Pseudomyrma bicolor*, Guér.
Pseudomyrma bicolor, Guér., Icon. Reg. Anim. Ins., 437.

Worker.—Length 5 lines. Obscure black; shining and thinly covered with a fine sericeous pile; the mouth, anterior margin of the face, the scape at the base and apex beneath, and the flagellum beneath, rufo-testaceous; the articulations of the joints of the legs, the anterior tibiæ and tarsi, rufo-testaceous. The first node,

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and the petiole of the abdomen, red; the node elevated anteriorly; the second segment globular, the extreme apex testaceous.

This species is from Columbia, and I think must be the same as that described by Guérin. I have only seen the single specimen which is in my own Collection.

Sp. 2. *Pseudomyrma unicolor*, n. s.

Worker.—Length 5¼ lines. Black, smooth and shining, covered with fine, short, pale, glittering pubescence, interspersed with scattered, erect, long, pale hairs; the upper surface of the thorax flattened, having the sides sharp and angulated; the mandibles rufo-testaceous; the claws rufo-piceous, the calcaria pale testaceous; the metathorax slightly curved above, from the base to the apex.

This species is from Brazil. I believe this insect would fall into the genus *Condylodon* of Lund. I have been unable to detect anything beyond specific differences between that genus and *Pseudomyrma*, as characterized by M. Guérin. In my own Collection.

Sp. 3. *Pseudomyrma termitaria.*

Female.—Length 3⅛ lines. Head black; the anterior margin of the face, the mandibles and scape ferruginous; the thorax and legs ferruginous, the wings hyaline, the nervures pale testaceous, the stigma fuscous; the tibiæ have the calcaria pale testaceous; the metathorax rounded posteriorly; the two nodes and basal segment of the abdomen ferruginous; the apical segments black; the entire insect is smooth and thinly covered with a very fine sericeous pile; the form of the thorax is an elongated oval, rather widest in front.

Worker.—Length 2⅛ lines. Coloured the same as the female; the thorax rather widest in front, the sides being compressed.

Mr. Bates finds this species constructing its elliptical chamber, or dwelling, in the walls of the tumulus of a species of white ant. I have no doubt of this being a species of *Pseudomyrma*, as described by Lund; its head is rather larger, and the eyes larger than in the other species.

Sp. 4. *Pseudomyrma maculata.*

Worker.—Length 3 lines. Head, antennæ, thorax and legs pale ferruginous; a small fuscous spot on the vertex, enclosing the ocelli; the eyes, a stripe down the middle of the metathorax, not reaching the apex, fuscous; the femora above, and the posterior tibiæ

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and tarsi, slightly fuscous; the petiole and first node of the abdomen pale ferruginous; the second node and the abdomen fuscous, and covered with a fine sericeous pile; the extreme apex rufo-testaceous; the apical segment has a number of long fuscous hairs; the head and thorax have a similar fine pile to that on the abdomen.

The habitat of this species is Brazil. In my own Collection.

Sp. 5. *Pseudomyrma sericata.*

Worker.—Length 3½ lines. Black, thickly covered with fine short silky pubescence; the anterior margin of the face and the mandibles testaceous-yellow; the antennæ rufo-testaceous, the flagellum sometimes slightly fuscous above; the legs testaceous, the anterior tibiæ and tarsi pale: the prothorax and margins of the scutellum rufo-testaceous; the petiole of the abdomen is of the same colour as the prothorax.

This species is also from Brazil. In my own Collection.

Sp. 6. *Pseudomyrma elegans.*

Worker.—Length 3 lines. The head and abdomen black; the scape in front, the base of the flagellum, the anterior margin of the face and the mandibles, ferruginous: the thorax, legs and nodes of the abdomen, ferruginous; the apical joints of the tarsi slightly fuscous; the entire insect destitute of pubescence.

This species was captured by Mr. Bates, at Para. In my own Collection.

Sp. 7. *Pseudomyrma nigriceps.*

Worker.—Length 2½ lines. Head black: the antennæ, mandibles, and the anterior margin of the face, rufo-testaceous; the thorax, abdomen and legs pale rufo-testaceous: the first node of the abdomen subtriangular, the upper margin being curved, the curve channelled from the base to the apex, the latter emarginate; the second node globose; the sides of the abdomen compressed, but not strangulated in the middle.

This species was captured by Mr. Bates, at Santarem, Brazil; it was found coursing over herbage, and also on sandy banks. In my own Collection.

Sp. 8. *Pseudomyrma oculata.* (Pl. XIII.)

Female.—Length 2¼ lines. The head, antennæ, prothorax, tibiæ and tarsi, pale rufo-testaceous; the head elongate, full two-thirds of the length of the thorax; it is also wider than the latter;

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the eyes very large, placed rather more within the face than in the other species; the antennæ rather more thickened at the apex than in the other species of the genus; the meso- and metathorax, abdomen and femora, fusco-testaceous; wings hyaline, nervures pale testaceous, the stigma fuscous; the sides of the thorax nearly parallel, transverse in front, the angles rounded; the metathorax obliquely rounded at the sides.

Worker.—2 lines. Closely resembling the female, but having the thorax strangulated in the middle, and compressed at the sides, and being altogether of a paler colour.

There is considerable difference in the form of the thorax and head of this species when compared with the others; and had I not possessed the female, and had an opportunity of observing that the neuration of the wings is identical with that of the others, I should probably have placed this insect in a separate genus. In addition to these reasons for retaining it, I have the observation of Mr. Bates on its habits, that of coursing over trunks of trees and leaves, in the same manner as the other species; and his note of observation—"this curious *Myrmica* is closely allied to No. 70," *P. nigriceps.*

Also from Brazil, in my own and other Collections.

Sp. 9. *Pseudomyrma pallida.*

Worker.—Length 2 lines. Pale testaceous yellow, smooth, shining and impunctate; the eyes and tips of the mandibles black; the thorax compressed at the sides, and somewhat narrowed posteriorly; the petiole of the first node of the abdomen pear-shaped, flattened above, and margined at the sides, the second node globular: the abdomen of a paler colour than the head, which is of a reddish yellow.

This species was found by my friend, the late Edward Doubleday, in East Florida, a locality in which he captured many rare and beautiful *Hymenoptera;* to this order he was greatly attached, and on the habit of many species he imparted much valuable information.

Genus Eciton, Latr.

Formica, pt. Fabr. Ent. Syst. ii. p. 364; Latr. pt. Hist. Nat. Fourm. p. 265.
Myrmecia, pt. Fabr. Syst. Piez. p. 425.
Eciton, Latr. Hist. Nat. des Crust. et des Ins.
Ancylognathus, Lund, An. Soc. Nat. xxvii.
Camptognatha, Westw. Griff. An. King. xv. 516.

The maxillary palpi 2-jointed; the basal joint clavate, broadest

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at the base; the second joint a little shorter than the first, truncate at the apex: the labial palpi 3-jointed; the basal joint longest, the apical one shortest, its apex truncate. Workers, of two sizes; the larger individuals, in some species, having their mandibles protruded in an elongate curve, sickle-shaped, acute at their apex; the smaller workers having the mandibles short, curved, broad and flattened in the middle; their apex acute: the tongue and palpi, when in repose, covered and protected by the labrum, which is convex, large and transverse, its inferior margin rounded; head large, wider than the thorax, in some individuals disproportionately large; eyes very minute, placed somewhat backwards and within the sides of the head, not visibly reticulated: the ocelli obsolete in the workers. *Thorax* unarmed; abdomen with two nodes at its base. The males and females not known.

Sp. 1. *Eciton hamata.*

Formica hamata, Fabr. Ent. Syst., ii. 364, 58; Latr. Hist. Nat. Fourm., p. 242, tab. 8, fig. 54.
Myrmica hamata, Fabr. Syst. Piez., p. 425, 6.
Eciton hamata, Latr. Gen. Crust. et Ins., iv. 129.
Ancylognathus, Lund. Ann. Soc. Nat., xxvii.
Camptognatha, Westw. Griff. Anim. King., xv. 516, tab. 76, fig. 4.

Worker.—Length 4—4½ lines. Antennæ longer than the head and thorax; the flagellum sub-filiform and pubescent, the pubescence short and scattered; the head very large, full twice the width of the thorax, widest in front, and armed behind with two short spines of a pale yellow-testaceous colour; smooth, shining and thinly sprinkled with short pale hairs; mandibles elongate, sickle-shaped, and bent suddenly inwards at their apex, forming a pointed hook; sometimes rufo-piceous, sometimes black. The thorax, legs and abdomen of an opaque reddish yellow, the tarsi fuscous: the nodes of the abdomen *without spines* beneath; the abdomen ovate; the entire insect thinly sprinkled with pale pubescence.

This insect is exceedingly abundant in Brazil; Mr. Bates has observed its legions in processions of great extent, but up to the present time has been unable to meet with the other sexes; this, however, he hopes to accomplish, but the societies are so numerous and the sting of the insects so severe, that an attack on one of their colonies for that purpose is not to be rashly undertaken.

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Sp. 2. *Eciton vagans.*

Formica vagans, Oliv. Ency. Méth., vi. 501.

Worker.—Length 4—5 lines. Entirely opaque, reddish brown; some individuals have the head and thorax blackish brown; the mandibles as in *E. hamata*; the head has, on each side behind, a short bent tooth, and a central impressed line running from the insertion of the antennæ and nearly extending to the vertex; the eyes larger than in *E. hamata*, the thorax of the same form as in that species: the first node of the abdomen has a short acute spine beneath, curving backwards, the second has also a minute spine pointing forwards; the abdomen concolorous with the head and thorax; but sometimes fulvous.

Worker (minor).—3 lines. Has the head of a different form to the larger worker, being oblong and rounded at the angles; the spines behind very small; the mandibles small, curved, and very broad at their apex, the inner edge very finely serrated; the thorax similarly formed to that of the larger worker; the articulations of the legs pale, the tarsi palest. Abdomen pale reddish yellow, the nodes having sharp spines beneath, as in the large worker.

This species appears to be equally abundant as the former, but has been hitherto confounded with it.

Sp. 3. *Eciton curvidentata.*

Formica curvidentata, Latr. Hist. Nat. des Fourm., p. 269, tab. 8, fig. 55.

Worker.—3½ lines. Reddish yellow; the head paler than the other parts; the flagellum fusco-ferruginous, the scape ferruginous and inserted in a fossulet, the edges of which are raised in front, and recurved round the base of each scapus; the mandibles dark brown; short, stout and broadly expanded, the inner edge finely denticulate: head wider than the thorax, narrowed behind, the posterior angles having each a short bent spine. Thorax: an obtuse tubercle on each side at the base of the metathorax; the first node of the abdomen having at its base beneath a small tooth on each side; the second node has a tooth at its base beneath, pointing forwards. Abdomen ovate, and pointed at the apex: the entire insect thinly sprinkled with pale hairs.

This is probably a smaller form of the worker, either of *E. hamata* or *vagans*: it appears to be equally abundant with both those species.

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Sp. 4. *Eciton rapax*, n. s.

Worker.—Length 4½ lines. The head, thorax and legs of an opaque black; seven or eight of the apical joints of the flagellum fulvous beneath; the head and mandibles as in *E. curvidentata*; the edges of the cavity for the reception of the antennæ rather more raised at the sides; the metathorax armed with two acute spines; the articulations of the legs, the apex of the tibiæ and tips of the joints of tarsi, ferruginous; the first node of the abdomen having beneath a small spine curved backward: the abdomen reddish-yellow, thinly sprinkled with pale pubescence; the legs, head, thorax and antennæ sprinkled with black hairs.

Worker (minor).—Very closely resembling the larger worker; the flagellum has more of the fulvous colouring; the tip of the scape, the anterior margin of the face and inner edge of the mandibles, more or less ferruginous; the legs rufo-fuscous, with their articulations as well as the tarsi ferruginous; the metathorax without spines, but having two longitudinal carinæ, not produced at their termination. The first node of the abdomen armed beneath, as in the larger worker; there is also a minute tooth at the base of the second node, pointing forwards; abdomen reddish yellow.

This species was found by Mr. Bates at Para, and also at Santarem; I have not been able to find any description of it, and believe it to be a new species. It is found in the virgin forests of Brazil, as observed by Mr. Bates, not in open sandy situations like most of the other species.

Sp. 5. *Eciton crassicornis*, n. s.

Worker.—Dark reddish brown; the head, thorax and legs opaque; antennæ short and thickened; the scape clavate, the flagellum having the joints short, the apical ones being broader than long, and fulvous beneath: mandibles black, short, stout and longitudinally strigose, the inner margin of the apical dilatation quadridentate; the head wider than the thorax, and deeply emarginate behind; the lateral angles acute, scarcely dentate; the metathorax has on each side, near its base, a minute tubercle, and is produced and emarginate behind: the legs shorter and stouter than in the foregoing species, their articulations bright ferruginous. The basal node of the abdomen has an elevated central carina, acute at its apex, the second node unarmed; the abdomen thinly covered with short yellow pubescence, the other parts very thinly sprinkled with short erect pale hairs.

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Worker (minor).—2¼ lines. Closely resembles the preceding, but having the legs proportionably more slender and longer; the head is narrower.

This species is from Villa Nova, Brazil; its short legs and thickened antennæ readily distinguishing it.

Sp. 6. *Eciton simillima*, n. s.

Worker.—Length 2 lines. Reddish yellow; the antennæ short and clavate; head elongate, emarginate behind, the lateral angles acute: the metathorax having two longitudinal carinæ, not produced at their apex; legs shorter than in any of the other species, except *E. crassicornis*, the first node of the abdomen having a minute acute spine beneath, at its base; the second also having a very minute tooth, or spine, directed forwards: the entire insect very thinly sprinkled with pale glittering hairs.

This species approaches nearest to *E. crassicornis*; but its flagellum is much more slender at the base, the head is more elongate, and the metathorax differently formed. Sent from Para, by Mr. H. W. Bates.

Sp. 7. *Eciton legionis*, n. s.

Worker.—Length 3 lines. Reddish yellow and shining; antennæ the length of the head and thorax, inserted in a large cavity in front of the head; the margins of the cavity raised in front, curving inwards round each scapus and passing upwards to the edge of the cavity: the head elongate ovate, slightly emarginate behind, the angles not produced; the eyes very minute. Thorax narrower than the head, compressed at the sides, and rugose above; the metathorax without carinæ or spines; the nodes of the abdomen unarmed beneath: abdomen ovate, very smooth and shining.

Worker (minor).—2 lines. Excepting in size I can detect no very distinctive difference from the large worker.

Of this species Mr. Bates observes, "I have only found it in open sandy and grassy campos; it shows the same irritability and hurried movement as the other species; is very quick to break line, and to attack furiously, any intruding obstacle. In a procession which I observed there were no individuals with the largely developed mandibles, as in other species. The locality in which I observed it being an open district, it afforded me an opportunity of observing some parts of its habits, and the business which occupies

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its immense processions; the columns of the other species I have always observed marching in the dense thorny thickets of the forest, so that the same facilities for observation do not offer themselves, and no human endurance can sustain the overwhelming attacks, the cruel sting and bite of these formidable insects. In this smaller species, although they climb by hundreds over one's person, in the same sudden way, the sting is not at all formidable. The first time I met with this species, it was near sunset: I found the column consisted of two trains of ants, moving in opposite directions; one train empty handed, the other laden with a variety of the mangled remains of insects, chiefly however the larvæ and pupæ of ants. I had no difficulty in tracing the line to the spot from which they were conveying their prey; this was in a low thicket, the *Ecitons* were moving rapidly about a heap of dead leaves; the tropical twilight was deepening, and I deferred further examination till the next day.

"On the following morning I found no trace of the ants in the place I had left them the preceding day, nor in the thicket were there any signs of insects of any description: but, at the distance of eighty or one hundred yards, I found them again, evidently engaged on another piece of business, a razzia of a similar kind, but requiring other resources of their instinct; they were eagerly occupied on the face of an inclined bank of light earth, excavating mines, whence, from the depth of eight or ten inches, they were extracting the bodies of a bulky species of *Formica*. It was curious to see them crowding round the orifices of the mines, and assisting their comrades to lift out the bodies of the *Formicæ;* the latter, being too bulky for one *Eciton* to carry, it was torn into pieces, and the laden marauders forthwith started off with their booty. On excavating the earth about the mines, I found the *Formicæ* at the depth of about eight inches, also their larvæ and pupæ. As fast as I excavated, the *Ecitons* rushed in, seizing the ants; I had great difficulty in securing a few specimens, they disputed them with me even in my hands: in excavating their mines, they assisted one another in so systematic a manner, with an appearance of so much intelligent co-operation, that it was truly a wonderful sight: those in the mines lifted up the pellets of earth to others stationed at the entrance, who forthwith conveyed them to a few inches distance from the place.

"I now turned towards the line of ants returning with their spoil of mutilated remains. For some distance there were many lines of them moving along the declivity of the bank, but at a short distance these converged; I then traced them to a large

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indurated and ancient Termitarium: up the ascent of this the *Ecitons* were moving in a dense column, like a stream of liquid metal; many were now assisting in lugging up the bodies of the *Formicæ*, and the whole disappeared in one of the spacious tubular cavities which always traverse these old Termitaria from the summit to the base.

"It would appear, from what I observed, that *Eciton* feeds its larvæ with animal food; the species of *Formicæ* seized by this species of *Eciton* has a soft succulent body, and, if not intended as food for the larva, for what other purpose are they procured? probably, like the leaves gathered by *Œcodoma*, they pass through a process of comminution, before being supplied to the larvæ."

Genus Myrmica.

Myrmica sævissima.

Worker.—Length 2½ lines. Rufo-testaceous; smooth, shining and impunctate; the head oblong, rounded behind, having a central impressed line on the forehead, which passes forward, dividing into a fork; the forked lines running to the base of the antennæ; the mandibles short, stout and longitudinally striated; their inner margins armed with four black teeth; the scape slender, slightly thickened towards the apex, about the length of the head; the flagellum nine-jointed, the club dilated, formed of the two apical joints. Thorax strangulated between the meso- and metathorax; the latter unarmed: the legs elongate, thinly sprinkled with erect short pale hairs: abdomen sub-ovate, truncated at the base, the apical half black, or dark rufo-fuscous; the nodes without spines beneath, the first compressed, its superior margin rounded and elevated a little above the second node, which is globose; the entire insect very thinly sprinkled with erect pale hairs.

Worker (minor).—1⅓ lines. Very closely resembling the larger worker, but not having an impressed line on the forehead; in other respects they correspond.

This appears to be one of the most fearful and dreaded of all the visiting ants. We have heard of houses, in this country, being deserted in consequence of their being infested by *M. domestica*, certainly an unpleasant inhabitant, but not calculated to strike terror, and to drive every one out of their houses; such is however the effect of the appearance of *M. sævissima*. Mr. Bates says, "on the borders of the river Tapajos, this is the much dreaded ant, the terrible scourge of the river Tapajos. In 1852

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I found, along the shores of the long sandy bays of the Tapajos, a continuous line of sediment, eight or ten miles in length, formed entirely of the bodies of the winged individuals of this species. It was the end of the rainy season, and the swarms had been carried away by the squalls of wind into the river, and had subsequently been cast ashore by the swell. This species is exclusively found in sandy soils, in open semi-cutivated or neglected places: in the shade of the woods not an individual is to be found; careful cultivation and weeding expels them from limited spaces; they increase only in the neighbourhood of deserted houses, or unweeded plantations; consequently, they are a scourge only to the lazy and worthless people who inhabit the shores of this magnificent river. Sometimes they increase to such an extent, that not an inch of ground is free from them; they dispute every fragment of food with the inhabitants; clothing they destroy for the sake of the starch, and attack persons with such cruel fury, that the lords of the creation are obliged to beat a retreat and the village becomes deserted. Their sting is very severe, the Brazilians liken it to the pain of a prick from a redhot needle, or point,—hence the name '*Formiga de fogo.*' Their *Formicarium* is subterranean, and in the village of Aveyros the unweeded streets are covered with their mounds: there are one or two on the floor of the church,—it is impossible in fact to avoid an attack. The '*Formiga de fogo*' lets no one have any repose; one's legs are instantly covered with them, and they appear to attack in sheer malice. I was frequently obliged to retreat to the house of the Commandant, where it was my daily custom to enjoy an evening chat with the priest and a few neighbours, seated on chairs, with stools to support the feet, the ground being in full possession of the spiteful" "*Mymica sævissima.*"

Appendix.

Since the foregoing paper was read to the Entomological Society, I have obtained a new species of the genus *Pseudomyrma*, which is of great interest, not only in exhibiting a very remarkable form, but also in throwing a light upon the history of the genus, which observation alone could furnish us with. For this I am indebted to the untiring industry of my friend Mr. W. H. Bates in observing the habits of these interesting insects. All the sexes were taken from the nest, formed in narrow, hollowed pith chambers in dried twigs; the sting of this species is very faint; the pupæ do not spin cocoons.

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In 1852 I published a paper on some Indian *Hymenoptera* in the Annals and Magazine of Natural History, in which was described and figured a new genus of ants, *Tetraponera*. At that time I was only acquainted with two species, *Tetraponera atrata*, from India, and *T. testacea*, from South America, the latter described in a note; these insects, both females, were remarkable for having an elongated head, nearly as long as the thorax, having the sides parallel; these insects prove to be females of the genus *Pseudomyrma*. In the British Museum are workers of a species of the genus from India, probably the same species as the female described in the Annals.

In order to render the present communication as complete as possible on the South American species of *Pseudomyrma*, I add the description of the species described in the Annals.

Sp. 10. *Pseudomyrma testacea*.

Tetraponera testacea, Smith, Ann. and Mag. Nat. Hist., 2nd Ser. ix. 45.

Female.—Length 3½ lines. Testaceous, smooth and shining; the head elongate, truncate behind, slightly emarginate at the vertex; a shallow impressed line running from the anterior stemma to the insertion of the antennæ, where it terminates in a deep sulcation, carinate at its sides; the eyes black, and elongate-ovate; the mandibles ferruginous, roughly channelled longitudinally, with irregular striations, the teeth black. Thorax elongate-ovate, the pro- and metathorax rounded, the meso-thorax fusco-testaceous above; the whole very smooth and shining. Abdomen: the basal segment clavate, the second globose, the third slightly constricted, the whole very smooth and shining.

Hab. South America (Napo).

In the British Museum.

Sp. 11. *Pseudomyrma cephalica*, n. s.

Female.—Length 3 lines. Pale yellow testaceous, very smooth and shining; the head thrice as long as broad, the sides parallel, the eyes elongate-ovate; the mandibles black at their tips; the posterior margin of the vertex slightly emarginate. Thorax narrower than the head, elongate, rounded in front and behind; a minute black spot at the insertion of the wings, which are hyaline and beautifully iridescent; the femora broad and compressed. Abdomen petiolate, the petiole of nearly equal width throughout, or very slightly widest towards the apex; the second segment

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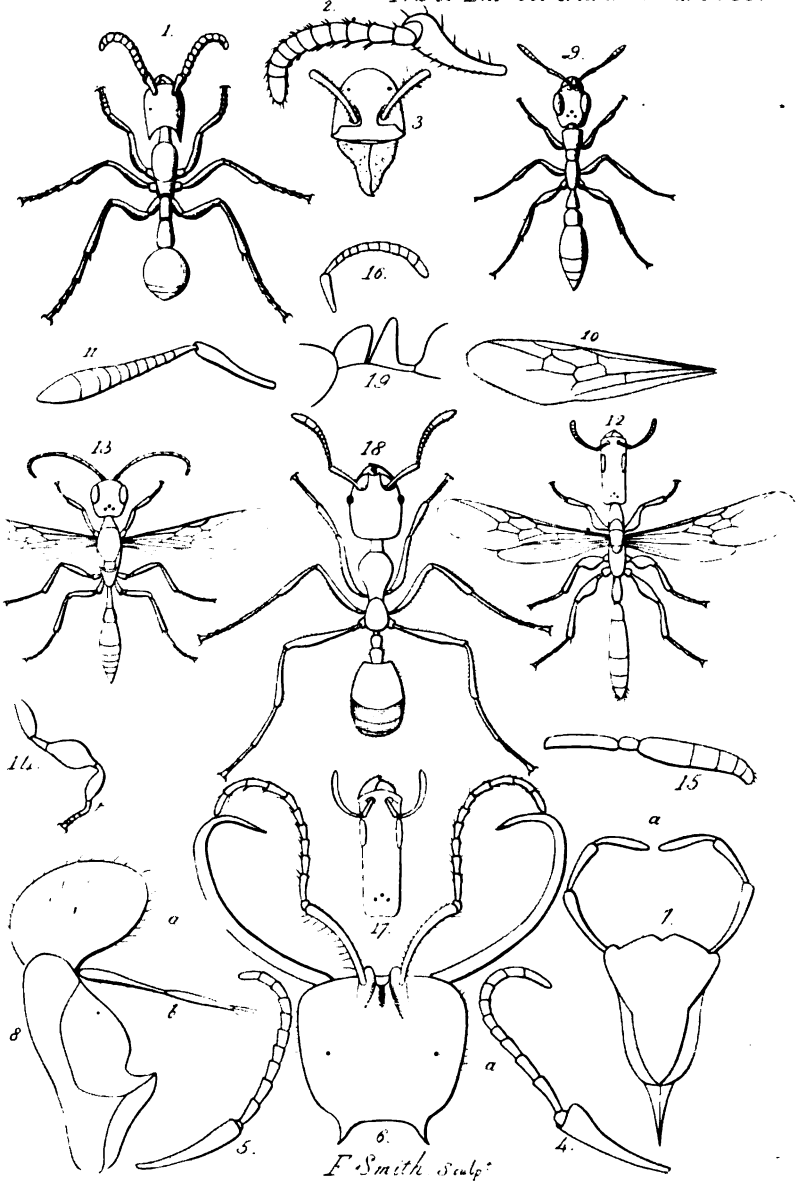

F. Smith Sculp.

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sub-globose; the base of the third segment fuscous, the two apical ones black, or fuscous.

Worker.—Length 2½ lines. Rufo-testaceous; the head and thorax palest; the entire insect is covered with a delicate silky pile, most observable on the abdomen; the head oblong, the eyes large, occupying a large portion of the sides of the head; the petiole of the abdomen narrowest at the base; the first segment sub-globose, widest at the apex, this and the following segments slightly fuscous, and sprinkled with a few glittering hairs.

This sex is very like the *P. oculata*, of which a figure is given, but the head is proportionably rather narrower; the prothorax is oval, not widest in front; the petiole is rather shorter, and not so slender at the base.

Male.—Length 2½ lines. Testaceous; the antennæ and legs pale testaceous; the head scarcely longer than broad; the eyes large, oval and placed at the sides of the head anteriorly; the ocelli large and glassy bright; the sides of the head rounded behind the eyes; the vertex emarginate. Thorax, the scutellum prominent; the wings hyaline, and beautifully iridescent, the nervures and stigma pale testaceous; the abdomen of the same form as that of the worker; the insect thinly covered with fine short silky pubescence.

Hab. Brazil (Villa Nova, on the Amazons).

EXPLANATION OF PLATE XIII.

Fig. 1. *Eciton crassicornis.* ☿.
2. Antenna of *Eciton crassicornis.* ☿.
3. Head of *Eciton raptor.* ☿.
4. Antenna of *Eciton raptor.* ☿.
5. Antenna of *Eciton curvidentata.* ☿.
6. Head of *Eciton hamata.* ☿.
   6*a*, the eyes.
7. Mentum of *Eciton hamata.*
   a, the labial palpi.
8. Maxilla of *Eciton hamata.*
   a, the lobe of the maxilla; *b*, the maxillary palpus.
9. *Pseudomyrma advena.* ☿.
10. Wing of the female.
11. Antenna of the same.
12. *Pseudomyrma cephalica.* ♀.
13. *Pseudomyrma cephalica.* ♂.
14. Anterior leg of *Pseudomyrma cephalica.* ♀.
15. Abdomen of *Pseudomyrma cephalica* ♀ in profile.
16. Antenna of *Pseudomyrma cephalica.* ♀.
17. Head of *Pseudomyrma cephalica.* ♀.
18. *Myrmica sævissima.* ☿.
19. Nodes of the abdomen of the same in profile.

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XVIII. *Monograph of the Australian Species of* Chrysomela, Phyllocharis *and allied Genera.* *By* J. S. Baly, Esq.

[Read November 6th, 1854.]

Isolated descriptions of many insects belonging to the present group are scattered through various Entomological works, both abroad and in this country; but hitherto no effort has been made to collect and arrange them under the different genera to which they properly belong: in the present paper I have attempted this, at the same time giving descriptions of the many new species existing in Collections.

I must return my best thanks to all those gentlemen, who have so liberally allowed me access to their Collections, placing in my hands, for description, many unique and valuable insects.

Table of Genera.

Antennæ dilated laterally .. .. .. *Diphyllocera.*
Antennæ simple.
Claws toothed.
Palpi ovate; antennæ moniliform .. .. *Phyllocharis.*
Palpi ovate; antennæ subfiliform .. . *Chalcolampra.*
Palpi clavate; antennæ filiform . .. .. *Eulina.*
Palpi clavate; antennæ subincrassate .. .. *Australica.*
Claws simple.
Palpi ovate; body elongate .. .. .. *Lamprolina.*
Palpi ovate; body globose.
——— last joint of palpi short .. .. *Cyclomela.*
——— last joint of palpi as long as the third *Chalcomela.*
Palpi clavate .. .. *Chrysomela.*

Genus 1. Phyllocharis, (Details, Pl. XIV. figs. 1*a*, 1*b*, 1*c*.)
Dal. Eph. Ent. 20.

Antennæ longitudine dimidii corporis, sub-moniliformes, articulo basali subgloboso, tribus proximis moniliformibus, equalibus, cæteris sub-filiformibus. *Palpi* breves, ovati, articulis brevibus, basali minuto, secundo et tertio clavatis, penultimo incrassato, ultimo conico, obtuso. *Unguiculi* dentati. *Corpus* oblongum; thorax transversim quadratus, lateribus subrectis; prosternum inerme; elytra thorace vix latiora, oblongo-ovata.

This genus, first separated from *Chrysomela* by Dalman in his

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the sides, disc remotely punctured in front, more closely and with coarser punctures towards the base. Elytra elongate, nearly four times the length of the thorax, their apex rounded; surface regularly punctate-striate in front, very finely and irregularly punctured behind, the sides and disc in front with eight deeply excavated round pits, arranged in three rows; these, together with the suture, cupreous. Beneath, with the thighs and base of tibiæ, pitchy red.

In the Collections of the British Museum and M. Deyrolle.

Genus 3. LAMPROLINA. (Details Pl. XIV. fig. *2a*, *2b*, *2c*, *2d*.)

● *Phyllocharis pars*, Boisd., Dejean.

Antennæ longitudine dimidii corporis, subfiliformes, articulis versus apicem leniter incrassatis. *Palpi* ovati; articulo basali minimo, secundo et tertio obovatis, penultimo incrassato, ultimo conico truncato. *Thorax* transverso-quadratus, lateribus subrectis. *Prosternum* infra angulatum, antipectore dentato. *Unguiculi* simplices. *Corpus* oblongum, nitidum, elytris metallicis.

This genus, the type of which is *Phyllocharis æneipennis*, Boisd., is distinguished from the last by its subfiliform antennæ, simple claws and toothed antipectus; all the species at present known to me are more or less red, with metallic green or blue elytra; they appear to inhabit the warmer parts of Australia.

Sp. 1. *Lamprolina æneipennis*, (Boisd.)

Oblongo-ovata, rufa, nitida; elytris viridi-æneis, thoracis lateribus foveis quatuor, elytris punctis magnis excavatis.

Long. 4—5 lin.

Phyllocharis æneipennis, Boisd. Voy. de l'Astrol., 574.

Oblong ovate, shining red; elytra brassy or metallic green. Head with the face deeply impressed in front, surface smooth, antennæ steel blue. Thorax subquadrate, narrowly margined, broader than long, its sides nearly straight, narrowed in front, anterior angles acute, front margin concave; surface smooth, the disc with a few remote punctures; on either side are two deep excavations, placed just within the margin, the latter slightly thickened. Scutellum smooth. Elytra rather wider than the thorax at the base, more than three times its length, sides suboval, slightly excavated behind the shoulders, the apex acutely

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rounded; surface shining, finely punctate-striate, the puncturing coarser on the sides in front, indistinct towards the apex; over the anterior portion of the disc and along the sides are scattered from eight to ten deep punctures. Abdomen red, the base sometimes pitchy. Legs red, apex of tibiæ and the tarsi black. Antipectus acutely toothed.

Sydney.

In most Collections.

Sp. 2. *Lamprolina grandis*, n. sp.

Oblonga, rufa; elytris abdomineque (hoc apice excepto) violaceis, tarsis nigris, thorace foveis quatuor excavatis, elytris tenuiter punctato-striatis.

Long. 6¾ lin.

Oblong, shining red. Head smooth, sparingly punctured, face grooved longitudinally; basal joint of antennæ red, the two following black (the rest wanting). Thorax transverse, twice as broad as long; the sides thickened, parallel behind, rounded and slightly widened in front, anterior angles obtuse, front margin concave; disc smooth, indistinctly punctured, towards the sides are a few shallow impressions; immediately within the lateral margin are two deep and punctured foveæ. Scutellum smooth, brassy black. Elytra violet-blue, four times the length of the thorax, sides parallel in front, slightly excavated below the shoulders, surface finely punctate-striate, irregularly punctured behind. Abdomen violet, its apex red, basal joints of tarsi black (the rest wanting). Antipectus obtusely toothed.

A single specimen of this fine insect, unfortunately very imperfect, is in the British Museum.

Sp. 3. *Lamprolina simillima*, n. sp.

Oblongo-ovata, rufa, nitida; elytris abdomineque (hoc apice excepto) cupreis, tarsis nigris, thorace lævi, foveis quatuor excavatis, elytris tenuiter punctato-striatis.

Long. 4—4½ lin.

Oblong ovate, shining red; elytra cupreous. Face grooved longitudinally, clypeus distinctly punctured; antennæ blue black, two basal joints red beneath. Thorax narrowly margined, transverse-quadrate, nearly twice as broad as long, narrowed in front, sides slightly thickened, sinuate, the posterior angles acute, front

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margin concave, the anterior angles subacute; surface smooth, shining; on either side, within the lateral margin, are two deeply impressed foveæ, on the disc are a few remote punctures, the sides of the base coarsely punctured. Scutellum impunctate. Elytra broader than the thorax, nearly four times its length, the sides oval, the apex rounded; beneath the shoulder is a shallow fossa; surface of elytra finely punctate-striate at the base, irregularly and indistinctly punctured behind. Beneath cupreous, the front portion of the thorax, apex of abdomen and the legs red, their tarsi black. Antipectus acutely toothed.

In the Collections of Mr. Curtis and M. Deyrolle. From the latter gentleman's specimens I have drawn the foregoing description. This insect is intermediate between *æneipennis* and *puncticollis*; from the former it is separated by the absence of lateral foveæ on the elytra, by their finer punctuation and the colour of the abdomen; from the latter by its smooth thorax: its smaller size and ovate form will at once distinguish it from *grandis*.

Sp. 4. *Lamprolina puncticollis*, n. sp.

Oblonga, rufa, nitida; elytris abdomineque æneis, tarsis nigris, thorace fortiter punctato, elytris punctato-striatis, prosterno obsolete dentato.

Long. 3½—4 lin.

Var. A. Thorace nigro-notato.

Oblong, shining red. Head coarsely punctured, vertex pitchy, basal joints of antennæ more or less stained with rufous, the rest steel blue. Thorax transverse-quadrate, twice as broad as long, its sides parallel, subsinuate, slightly enlarged and thickened behind the anterior angles, which are acute, front margin concave; surface irregularly crowded with coarse punctures, the sides variolose. Scutellum red. Elytra brassy green or cupreous, nearly four times the length of the thorax; their sides suboval, slightly excavated below the shoulders, scarcely wider than the latter at their base, apex obtusely rounded; surface punctate-striate, the striæ irregular on the sides, punctures indistinct towards the apex; below the shoulder is a larger impression. Abdomen blue green, coarsely wrinkled, its apex red. Legs red, tarsi black. Antipectus obsoletely toothed.

Var. A. Thorax with several black spots on the disc.

Australia (Richmond River).

In most Collections.

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Genus 4. Eulina. (Details, Plate XIV., fig. 3*a*, 3*b*, 3*c*.)

Antennæ filiformes, longitudine dimidii corporis, vix incrassatæ, articulis (tertio ad apicem) equalibus. *Palpi* clavati, articulo ultimo truncato. *Thorax* transversus, elytris angustior. *Elytra* elongata, lateribus rectis. *Pedes* simplices, unguiculis dentatis. *Corpus* obscurum, elongatum, angustatum.

A singular genus, remarkable for its narrow elongate form; it is nearly allied to *Phyllocharis*, but differs in its clavate palpi and filiform antennæ; the joints of the latter are elongate, nearly equal in length and scarcely thickened towards their apex.

Sp. 1. *Eulina Curtisii*. (Plate XIV. fig. 3.)

Elongata, læte fulva; elytris punctato-striatis fuscis, maculis plurimis et pone medium lineâ transversâ flexuosâ fulvis ante apicem lineâ flavâ, pedibus flavis, quintus tarsisque nigris.

Long. 4¼ lin.

Elongate, piceous, with a light metallic reflection. Head shining, vertex fuscous, face canaliculated, separated from the clypeus by a semicircular groove. Antennæ black, half the length of the body, filiform, joints nearly equal. Thorax subquadrate, rather broader than long, narrower than the elytra; sides straight and parallel behind, narrowed before, front slightly concave; disc smooth and shining, impunctate, with a large fuscous patch in the centre, sides deeply and irregularly pitted. Elytra dark fuscous, narrow, nearly four times longer than the thorax; their sides parallel, slightly narrowed behind near the apex, at their extreme tip truncate; above slightly convex, surface strongly punctate-striate, the interstices marked with deep fulvous spots; about the middle is an irregularly waved transverse fulvous band; near the apex is a second, yellow, broader than the first. Beneath fulvous, sides of the pleuræ narrowly marked with black. Legs yellow, knees and tarsi black.

This insect, which I have named after Mr. Curtis, is unique in that gentleman's Collection; he does not know the precise locality.

Genus 5. Chalcolampra, Homb. et Jacq. (Details, Plate XIV. fig. 4*a*, 4*b*, 4*c*.)

Homb. et Jacq. Voy. au Pôle Sud, Zool. iv. fol. 328.

Antennæ filiformes, longitudine dimidii corporis, versus apicem leniter incrassatæ, articulo secundo brevi. *Palpi* ovati,

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articulo ultimo conico. *Thorax* transverso-quadratus vel transversus, elytris angustior, lateribus subrectis. *Elytra* oblongo-ovata vel oblonga. *Pedes* simplices, unguiculis dentatis. *Corpus* obscurum vel metallicum, elongatum.

This genus approaches very near to *Phratora*, but in the latter the second joint of the antennæ is as long as the third, and the third joint of the tarsi is more or less deeply bilobed; several of the species of *Chalcolampra*, although of larger size, have a very strong resemblance to our *Phratora vitellinæ;* the genus has been characterized by Hombrom and Jacquinot in the Voyage au Pôle Sud. Several species had been previously described by Germar and Erichson, to one of which, *acervata*, Germ., the type of Homb. and Jacq. has been referred with doubt; their description being too short and imperfect to enable me to decide with certainty.

Promechus æneus of Boisduval, Voyage de l'Astrolabe, probably belongs to this genus, but the description is too slight to be of the least use in determining the species.

I. *Elytra much wider than the thorax.*

Sp. 1. *Chalcolampra pustulata*, n. sp. (Plate XIV. fig. 6.)

Elongata, convexa, picea; elytris oblongo-ovatis, thorace fortiter punctato, lateribus antice tuberculatis, fulvis; elytris irregulariter fortiterque punctato-striatis, singulo tuberculis elevatis 11, pallide fulvis.

Long. 4 lin.

Elongate; elytra oblong ovate, convex, wider than the thorax, pitchy brown. Head shining, clypeus separated from the face by a deep semicircular groove, mouth and seven basal joints of antennæ fulvous. Thorax subquadrate, scarcely broader than long, sides and front nearly straight; surface coarsely and irregularly punctured; on the edge, just behind the anterior angle, is a raised smooth tubercle, which, together with the margin itself, is fulvous. Elytra oblong-ovate, convex, much broader than the thorax and nearly three times the length; sides ovate, broader behind, apex obtusely rounded; surface coarsely and irregularly punctate-striate; the raised margin and about eleven smooth shining tubercles, scattered over the disc and along the edge of each elytron, pale fulvous. Legs fulvous, thighs darker.

Melbourne.

I have seen but two specimens of this species, one in my own cabinet, the other in the British Museum.

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This curious insect, which, as well as *constricta*, differs from the rest of the species in its nearly square thorax and broad elytra, when seen in certain positions somewhat resembles a *Notiophilus*; its tuberculated thorax representing the prominent eyes of the latter genus.

Sp. 2. *Chalcolampra constricta*, (Erich.)

Elongata, ovata, convexa; elytris oblongo-ovatis, viridi- (vel fusco)-ænea, ore, antennis, thoracis angustioris margine, tibiis tarsisque testaceis, elytris punctato-striatis, margine lineolisque nonnullis, flavis.

Long. 3—4 lin.

Chrysomela constricta, Erich. Arch. für Nat. 1842, f. 230.

Australica? *strigipennis*, White, in Stoke's Voyage, Append. 512, pl. 2, fig. 9.

Elongate-ovate, brassy green (or fuscous), shining. Mouth and antennæ testaceous, the latter filiform, slightly thickened towards the apex. Face sparingly and indistinctly punctured, slightly canaliculated, separated from the clypeus by a deep curved groove. Thorax much narrower than the elytra, scarcely broader than long, the sides parallel, the base and apex truncate; surface slightly convex, sparingly covered with deep coarse punctures, margin testaceous. Scutellum smooth. Elytra oblong ovate, convex, deeply punctate-striate, the puncturing less deep near the apex; the lateral margin, a short line on the middle of the last interstice, a longer one on the last but one, confluent behind with the margin, and a shorter stria on the last but two, near its middle, yellow. Legs, coxæ and trochanters pitchy testaceous, thighs brassy, tibiæ and tarsi yellow testaceous.

Van Diemen's Land (Erichson).

Melbourne, my Collection.

An insect in the collection of the British Museum, described by Mr. A. White under the name of *Australica strigipennis*, agrees with the above in all particulars except its colour, which is fuscous. I have a single specimen in my own collection from Melbourne, somewhat larger, its thorax rather wider and slightly rounded on the sides, the yellow markings on the thorax and elytra absent, with the exception of a few spots at the base of the latter, and a single stria running along the posterior half of the third interstice from the margin; it is probably a variety of the other sex; it would doubtless be found in a long series to vary much in its markings.

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II. *Elytra scarcely broader than the thorax, their sides more or less parallel.*

Sp. 3. *Chalcolampra thoracica*, n. sp. (Plate XIV. fig. 4.)

Elongata, fusco-ænea; thoracis lateribus fulvis, puncto rotundato fusco.

Long. 4 lin.

Elongate, brassy-brown. Head shining, face separated from the clypeus by a deep groove, mouth and vertex fulvous. Antennæ half the length of the body, slightly increased in thickness towards the apex. Thorax transverse, two-thirds as long as broad, anterior margin slightly concave, sides rounded in front, nearly straight and slightly narrowed behind; surface convex, with a few distinct punctures scattered over the disc, more crowded at the base; sides broadly fulvous; on the margin in front is a large round spot, the same colour as the disc. Elytra rather broader than the thorax, three times the length, their sides oval, apex acutely rounded; surface shining, punctate-striate, near the apex the puncturing is much fainter and irregular.

Adelaide.

In the Collections of Mr. Waterhouse, the British Museum and my own.

Sp. 4. *Chalcolampra parallela*, (Germ.)

Elongata, fusco-ænea; antennis ferrugineis, pedibus piceis, thorace disco remote, lateribus confertim punctato, elytris punctato-striatis.

Long. 3 lin.

Chrysomela parallela, Germ. Lin. Ent., v. 3, fig. 237.

Elongate, brassy-brown. Antennæ red, half the length of the body, slender, filiform, slightly thickening by degrees towards the apex, third joint elongate. Head slightly punctured, face separated from the clypeus by a deep semicircular groove, mouth pitchy. Thorax twice as broad as long, sides rounded in front, anterior margin slightly concave, hinder rounded, its disc remotely, sides more closely punctured. Scutellum smooth. Elytra slightly broader than, and three times the length of the thorax, their sides parallel, apex obtusely rounded; surface punctate-striate. Body beneath nigro-æneous, punctured; apex of tibiæ and the tarsi paler.

Adelaide (Germar).

Some specimens in the British Museum, formerly in the Cabinet of the Entomological Club, sent from Adelaide by Mr. Davis, agree in most particulars with the above description; they are rather smaller, and the antennæ are scarcely half the length of the body; they are possibly the other sex.

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Sp. 5. *Chalcolampra acervata*, (Germ.) (Details, Plate XIV. fig. 4*a*, 4*b*, 4*c*.)

Elongata, fusco-ænea; pedibus piceis, thorace acervatim punctato, elytris punctato-striatis.

Chrysomela acervata, Germ. Lin. Ent., v. 3, f. 238.

Chalcolampra convexa? Homb. et Jacq. Voy. au Pôle Sud, Zool. iv. fol. 329, pl. 19, fig. 6.

Long. $2\frac{1}{2}$—$3\frac{1}{2}$ lin.

Elongate, brassy-brown. Antennæ black, half the length of the body, less slender than the last, thickened towards the apex, third and fourth joints equal. Palpi black. Head sparingly punctured, clypeus separated from the face by a deeply impressed curved line. Thorax half as long as broad, its sides slightly rounded; surface coarsely punctured, puncturing thicker towards the posterior angles. Elytra oblong ovate, scarcely wider than the thorax, three times its length, punctate-striate, striæ distinctly punctured. Beneath sparingly punctured, legs pitchy.

Adelaide, Melbourne.

In most Collections.

This insect, which appears to be the most common in the genus, is sent in most collections from South Australia; it differs from the last in having thicker antennæ, and in the relative length of the third and fourth joints; the sides of the elytra are rather less parallel.

Sp. 6. *Chalcolampra repens*, (Germ.)

Elongata, fusco-ænea; subtus nigra, thorace lateribus punctato, elytris punctato-striatis.

Long. $3\frac{3}{4}$ lin.

Chrysomela repens, Germ. Lin. Entom., v. 3, f. 237.

Elongate, the elytra more convex than in the last species; the thorax has a steel-blue tint, and the elytra occasionally a metallic green reflection. Antennæ black, stouter than in the two preceding species, half the length of the body, third and fourth joints equal. Head and palpi black, the former finely and remotely punctured; clypeus separated from the face by a deep groove. Thorax twice as broad as long, sides slightly rounded, coarsely punctured, disc smooth and shining, slightly convex, with a few deep punctures scattered on its surface. Elytra obsoletely sulcate, sulci deeply punctured. Body beneath finely punctured, brassy black, legs black.

Adelaide, Melbourne.

In the Collections of the British Museum, Mr. Waterhouse and my own.

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Sp. 7. *Chalcolampra chalybeata*, n. sp.

Elongata, chalybeo-cyanea; ore pedibusque rufis, tarsis nigris.
Long. 3½ lin.

Elongate, steel-blue; sides of the elytra nearly parallel, the general form of the insect being that of *parallela*. Head and basal joints of antennæ rufous, the rest and a large patch on the face black. Antennæ half the length of the body, joints as thick as in the last species and increasing in size towards the apex. Thorax twice as broad as long, slightly concave in front, sides somewhat rounded, surface shining, with a metallic green reflection, disc with a few scattered dots, sides coarsely punctured; the whole surface under a lens is seen to be crowned with very fine punctures. Elytra finely punctate-striate, the single row of dots composing each stria more regularly placed, and at more distant intervals than in the other allied species; the puncturing becomes indistinct near the apex. Beneath with the extreme apex of the abdomen and the legs red, tarsi black.

From Van Diemen's Land. A single specimen in the British Museum.

Sp. 8. *Chalcolampra similima*, n. sp.

Elongata, fusco-ænea; antennis pedibusque pallide piceis, tarsorum articulo basali dilatato.
Long. 3 lin.

Elongate, convex; elytra not broader than the thorax, their sides oval. Head shining, clypeus coarsely punctured and separated from the face by a shallow semicircular impression. Antennæ slender, half the length of the body, scarcely thickened towards the apex, third joint elongate, equal in length to the fourth and fifth united. Thorax convex, its sides rounded, front margin concave; surface shining, covered with scattered punctures. Elytra three times the length of the thorax, sides oval, slightly convex above, surface punctate-striate, the punctures placed on the striæ at more irregular intervals than in the last. Legs pale pitchy, basal joints of the tarsi (particularly in the two anterior pairs) dilated.

Swan River.

One specimen in my own Collection.

In my insect, the fourth and fifth joints of both antennæ are soldered together. As this is probably a monstrosity, I have not mentioned it in the specific character.

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Sp. 9. *Chalcolampra* 18-*guttata*, Fab.

Ovata; elytris fuscis, punctis octo pallidis quibusdam connexis.
Chrysomela 18-*guttata*, Fab. Entom. Syst., i. 322.
Phyllocharis 18-*guttata*, Boisd. Voy. de l'Astrol., 575.

Head pale fulvous, with a basal spot and the antennæ black. Thorax transverse, above convex, pale fulvous, with three fuscous spots on the disc. Elytra finely punctate-striate, fuscous, with eight pale fulvous spots, sometimes connected at the base. Abdomen black, the margin pale.

The specimens in the Banksian Cabinet, described by Fabricius, are in too imperfect a state for examining the parts of the mouth, or for detailed description. I have however no doubt that they belong to the present genus; there are several nearly allied species from Ceylon and other Islands of the Indian Ocean.

SPECIES NOT KNOWN TO ME.

Chrysomela pacifica, Erich.

Sub-elongata, ænea, nitida; ore tibiisque piceis, pygidio testaceo, elytris subtiliter striato-punctatis.
Long. 2¼ lin.

Erich. Arch. f. Nat. 1842, f. 238.

Chrysomela aucta, duplo major et paulo magis elongata, subcylindrica, ænea, nitidula. Antennæ piceæ. Caput fronte sparsim, medio subtiliter, lateribus fortius punctata utrinque sulcata, clypeo parum convexo, sulco arcuato a fronte distincto, ore piceo. Thorax coleopteris paulo angustior, latitudine plus dimidio brevior, lateribus subrotundatus, basi leviter rotundatus, apice leviter emarginatus, leniter convexus, dense subtiliter punctatus, ante latera utrinque punctis majoribus conspersus, dorso utrinque subimpressus. Scutellum læve. Coleoptera oblonga parallela, leniter convexa, subtiliter striato-punctata, punctis apicem versus obsolescentibus, intersticiis omnium subtilissime transversim strigosis. Abdomen segmento ultimo inferiori margine piceo, superiori toto læte testaceo. Pedes tibiis apice tarsisque piceis. Unguiculi basi obsolete dentati.
Van Diemen's Land.

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XIX. *Observations on the Honey Bee, in Continuation of the Prize Essay of the Entomological Society for the Year 1852.* *By* J. G. Desborough, Esq.

[Read 2nd April, 1855.]

On the 16th July, 1852, the observatory hive was stocked with a cast from a hive which had swarmed on the 4th of July. The object in stocking it with a cast in lieu of a swarm was simply that the space within the hive was thought to be too confined to admit a swarm. It had been stocked three times previously by an Apiarian friend in a situation where I had the opportunity of inspecting it daily, once with a swarm and twice with a cast; on the first occasion the bees deserted the hive entirely on the day after being hived; on the second, though the stock flourished during the summer, and the labours of the bees were constantly under inspection, the approach of winter was fatal; and on the third occasion, in the month of January, the hive was removed into my bed room, but too late to save the lives of the bees—damp and disease had taken too deep a root, and the stock died; there was plenty of food, and starvation was evidently not the cause of death. This happened in January, 1852.

My attention was then specially directed to the possibility of keeping a stock alive during the winter, so as to be able to watch the proceedings of the queen during the entire year; and notwithstanding the discouraging results of the previous attempts I resolved to establish the hive in a room in my own house, and, on the approach of winter, to watch attentively the necessities of the stock, and be guided by circumstances.

The hive was accordingly set up on the 16th July; on the 21st the queen was depositing eggs; at 10 P. M., on the 29th, a considerable quantity of the brood was sealed over; on the 5th August I counted 4,090 cells containing brood; on the 10th, young bees coming forth; on the 19th, second course of brood sealed over. Thus, during little more than a month, the queen had laid more than 8,000 eggs; the hive had been about three-fourths filled with comb, and a considerable quantity of pollen and honey had been gathered and stored. The laying of eggs was discontinued by the end of August, and the bees seemed to be

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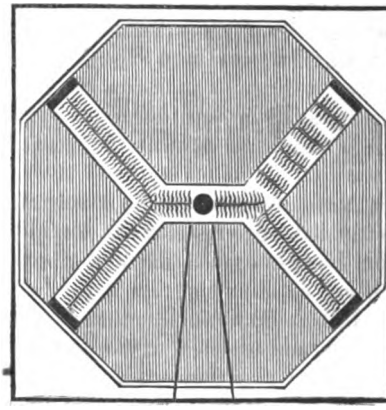
gradually sinking into a state of repose. I now digress to describe the hive.

The ground plan of the observatory hive is here represented.



It will be seen to consist of an outer case, the sides whereof are all moveable. The shaded parts are stuffed with blankets to preserve the natural heat of the bees; the white space is the part occupied by the bees, and the black dot in the centre is a hollow pivot on which the whole hive turns, and up which the bees enter the hive: the hive stands on a square board, with a long passage therein, communicating with the pivot, and joining a hole in the sill of the window at which the hive stands. The darker marks in the plan are grooves in the wooden top and bottom of the hive, in which plates of glass run, forming the sides of the hive; the ends of the hive, shown by thick black marks, are of wood, and form the support of the top of the hive, taking the weight off the glass sides; they are dovetailed loosely both top and bottom, and secured by a screw; the hive turns freely on its pivot, so that each division can be brought directly opposite the eye of the Apiarian, and this turning of the hive does not in any way interfere with the entry or exit of the bees. Guide combs were placed in the hive, so as to induce the bees to build the combs straight; in three divisions they did so, but in the fourth division the comb was not securely fastened, and on its breaking down the bees built combs across, in the direction shown by the above plan. I might probably have remedied this, and have induced the bees to build the comb parallel to the glass, but my idea was, that these combs would form a warmer and more natural situation for the bees to winter in than the other divisions, where each side of

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the comb was bounded by glass, whilst here the bees might lie between two combs. I therefore did not disturb them in their work, but let it proceed; much to my astonishment, however, the bees have invariably deserted this division of the hive on the approach of winter.

To resume—during the months of September and October the bees seemed much to diminish in numbers; but this apparent loss was more seeming than real, owing to the bees clustering more closely together; still the number was gradually diminishing, but no dead bees were to be found *in* the hive.

The month of November altered the aspect of the stock; the bees were evidently sinking into a state of torpidity, and those on the outside of the cluster began to fall to the bottom of the hive. Possibly if the bees had been lying *between two combs* they would not have fallen; they could not hold on the glass, and when they lost their hold of the comb and fell to the bottom, the coldness of the air chilled them, so that they could not again crawl up the comb. During this period the space of about an inch and a half round the queen was always kept at a warmth perceptible to the hand through the glass; when, however, a day of sunshine came, most of the bees at the bottom of the hive revived, and thus the danger of a dwindling exhaustion of numbers to death seemed to be averted. During the last week of November, however, it became quite apparent that some artificial means must be resorted to for the purpose of preventing the bees lapsing into this torpid state. Under ordinary circumstances this state of torpidity might be safety; but with so much glass in the hive, which must be warmed, as well as the atmosphere of the hive, on the return of the spring it was quite clear that the stock would be absolutely starved to death long before the sun could exercise any influence sufficient to resuscitate the stock.

This state of the hive caused me great anxiety, and after much consideration I determined to try the effect of the administration of food* in small quantities. I therefore each evening gave them a small portion of food for the purpose of rousing the bees into activity; not for the want of food was it supplied, but simply to prevent the bees from sinking into a state of torpidity. Immediately after the food was supplied the heat of the hive was always increased from the commotion it caused, and the few bees which from day to day fell to the bottom of the hive, in a great measure revived from this increased heat: thus far my experiment succeeded. This system was continued during all the months of

* Honey slightly diluted with water, adding a little salt.

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December, January and February, and the bees even stored the honey given to them, and sealed it over, thus showing that food was not wanted so much by them: nor indeed was that my object in supplying the food; it was merely to keep up the excitement. The room in which the bees were kept was carefully regulated as to the heat, the thermometer never being suffered to fall below 46° in the day and 40° in the night. Whenever the sun shone the hive was placed on its stand at the window and access to the outer air allowed, but at other times the hive was removed into the centre of the room; and it is really astonishing to observe the effect a few hours of even winter sunshine has upon such a hive; if the hive got really warmed by the sun the bees revived in a most extraordinary manner, much more so than from any feeding or heat derived from a fire.

I may here remark, that a limit must be had to the degree of heat at which the hive must be kept in the winter, and that too great a heat is as dangerous as too severe a cold. One night in January, having made up a good fire in the room previously to going to bed (the night threatening to be very severe), and removed the bees into the room, a sudden change took place, and the thermometer in the room stood at 65°. The hum of the bees awaked me, and the remarkable noise made by them at once evinced distress; upon opening the hive the bees were in a state of great excitement, and the temperature in the hive was 82°. I therefore set the bees on their stand, and gave them access to the air, when they gradually quieted down; the weather had suddenly changed, and it would seem that the bees were even sensible of the change, and the irritation caused by their being shut up had roused their energy and created the mischief.

These proceedings bring me to the month of March. The number of bees was now considerably reduced; I had constantly removed the dead bees, and at this time the space occupied by the bees on two sides of the comb, in one division only of the hive, was a circle of about six inches in diameter in the day, and reduced to about four inches and a half at night; the number was certainly under 1000, and I was much afraid the gradual deaths would reduce that number too low to rally. The month of February had been very frosty, and much snow fell; on the 23rd of February I had seen a grub brought out of a hive in a neighbour's garden, but I could see no signs of breeding in my observatory; still the few bees looked healthy, and the queen seemed to become more active, and I fancied increased in size; and on the 1st of March the bees began to keep very close upon

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a small portion of the comb, and reposed in the cells (which hitherto they had not done). I suspected eggs were laid in these cells, but I could not see them on account of the bees being in the cells, and I did not dare to disturb them, so as to make them come out of the cells, fearing the consequence of too great irritation; and I therefore waited patiently till the 3rd of March, when I saw the queen depositing eggs, and the cells where the bees had clustered all contained brood; on the 5th the cells of brood were partly sealed over, and the space occupied by the bees was being gradually enlarged. On the 14th of March the space occupied by brood on one side of the comb measured 4 × 3 inches, and on the other side 5 × 3 inches; the number of brood, therefore, being 729. This quantity of brood had not increased since the 8th, and they were all hatched off prior to the queen again commencing laying, which she did early in April, as I detected her depositing eggs on the 4th, and on the 7th brood was again being sealed over; on the 21st of April the same space was again occupied by brood as on the 14th of March, and the breeding was now continued without interruption during the summer.

The progress of the hive may be traced by the Table, showing the quantity of brood each time of measuring, at intervals of twenty-one days; a few stray extracts from my Note Book during the summer may, however, be interesting.

"1853.

March 6th. First day pollen collected, and bad weather till the 10th.

May 6th. Brood increasing rapidly, though weather cold.

18th. Observed *one* drone grub sealed over amongst the workers, the cell being lengthened.

31st. The drone grub observed on the 18th appeared to be breaking the cover of the cell at 4 P.M.; at 10 P.M. the drone's head was uncovered, and the cell broken away to the surface of the worker comb, but it appeared dead; got him out of the cell, but he had been killed.

June 9th. Drone cells commenced.

28th. Drone eggs observed.

July 2nd. Store of honey rapidly decreasing, and the cells occupied with brood. Weather the last ten days very wet, stormy and bad.

15th. Drone grubs destroyed in the cells, and those sealed over torn out.

September. Breeding ceased."

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The proceedings of the hive from this time to the 1st of November were a mere repetition of the preceding year, but the bees appeared more numerous. On the 1st of November, I began to supply small portions of food, but by the middle of the month the interior of the hive appeared excessively damp—the condensed vapour in the shape of water ran down the glass, and collected at the bottom of the hive, drowning or starving every bee happening to fall down, and the comb appearing literally soddened with wet. I bored holes in the bottom of the hive to drain off the moisture, and took every precaution I could, but still I lost a great number of bees.

On the 1st of December I discontinued the feeding, and kept the room warmer without giving access to the outer air, which had been extremely heavy and moist during the preceding month, and an improvement in the state of the hive was soon evident. The month continued very cold, and on the 26th the bees emigrated from one division of the hive to another, having consumed all the store of honey in the first division before departing. I cut out all the comb from this division, and it could only be compared to wet brown paper—still it was not mouldy.

1854. The first week of January, 1854, was excessively cold, with much snow, a thaw commencing on the 8th. I occasionally administered food during this month, but the mortality amongst the bees was very great; the interior of the hive began to be very dirty, and the bees voided their excrement on the glass, nor could I devise any means to clean it. I however cut strips of paper and laid them each day on the bottom of the hive, and thereby removing every morning the dead bees and the dirt; the paper likewise absorbed the moisture and in some measure dried the interior of the hive by that means; still the best remedy of all was the return of sunshine. On the 20th February I saw pollen collected, and on the 3rd of March I detected brood.

The bees at this period were reduced to a much smaller number than in the preceding year; and any one, however well acquainted with the habits of bees, would hardly have believed that the small number then existing would be able to rear sufficient brood to recruit the strength of the hive. The diameter of the circle occupied by the bees at this time did not exceed four inches and a half in the day, and three inches at night. It is true I took especial care that they should not want for food, and the quantity consumed was great, considering the number; no doubt the heat kept up for hatching the brood required a larger consumption of food than the mere sustenance of the life of the bee would have done. I again

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refer to the Table to show the progress during the year, and add a few more extracts :—

"1854. May 14. Honey sealed over.
„ 24. A few drones sealed over.
June 8. First drone seen.
„ 18. Numbers increased so much as to require extra space, and therefore put on glasses.
„ 25. Working in 5 glasses, and the honey deposited in the glasses in the day nearly all carried down to brood in the night.
July 9. Observed a queen's cell, which I destroyed to prevent swarming if possible.
„ 27. Drones killed.
Nov. 13. Began feeding.
„ 25. Hard frost with much sun—got out 205 dead bees.
Dec. 3. Removed 129 dead.
„ 10. Removed 74 apparently dead, but only 38 really so, the remainder reviving on being warmed before a fire.
„ 31. To this time no dead removed, probably about a score lying at the bottom, but I would not disturb the hive by removing them."

The proceedings of the hive during the summer of 1854 do not call for any especial remark, except that the drones were this year allowed by the workers to come to perfection, whilst during the preceding year (1853) they had all been killed, either in the grub or pupæ state; also that one queen's cell was begun, which was likewise not the case the former year: this cell was destroyed by me as soon as observed, my object being to keep the *same queen* under observation as long as possible. The situation of the hive in the centre of a town rendering the chance of taking a swarm from the hive extremely doubtful, my only hope of keeping the original queen under observation is to prevent swarming—hitherto I have succeeded.

Thus closes the third season of the observatory hive, embracing a period of two years and a half, during which all the labours of the bee have been incessantly watched; and although the trouble and anxiety have been great, still my efforts have been amply rewarded by the positive manner in which I can speak as to certain facts, either previously unknown to Apiarians, or respecting which considerable doubt existed.

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When I sent in the Essay to the Entomological Society for competition, in December, 1852, the observatory hive had only been stocked five months, and the observations upon it had only been registered for that period and had never been continued through a winter: the advertisement for such Essay was only brought under my notice in June, 1852, too late to institute any experiment on the particular subject of the Essay, and it was therefore prepared from materials certainly not collected with any—even the most remote—view to such a purpose; but it is highly gratifying to see how nearly the actual admeasurement of the numbers produced in a hive during the season corresponds proportionately with the table contained in the Essay (which, of course, was but an approximation of the *actual* number of bees bred in a hive). The total numbers are much smaller in the observatory hive than in the table of the Essay, but it must be borne in mind that the cubical contents of the observatory is much smaller than an ordinary hive.

It will be seen by the detailed proceedings of this stock of bees, that from July, 1852, to June, 1854, *no drones were existing in the hive*; consequently no second impregnation of the queen could take place during that period, and therefore that all the eggs produced were the result of *one* impregnation; thus proving at least that *the impregnation of the queen lasts for more than one season.*

On reference to the notes of the year 1853, it will be seen that the 6th of March was the first day of pollen being collected—now on that day, 729 bees had been reared and sealed over without a particle of pollen or bee bread being present in the hive; all had been consumed previously; this I can speak to positively, because by removing the covers from opposite sides of any division of the hive, I was enabled to look through the comb, and on doing this no bee bread could be seen, the cells were all clearly to be seen through. I am now speaking of the month of February. I had fully expected to see brood before that time; and finding no bee bread, and the season being so backward that none could be collected, I naturally attributed the want of brood to the absence of pollen. I therefore cut up the comb from a dead hive and supplied pieces containing pollen, but the bees in the observatory would not touch it, and when I saw brood and that the bees refused to eat the pollen, I removed the comb altogether; and I can positively aver, that these 729 bees were reared with no other food than honey—honey and honey alone is the food of the grub of the bee. Since that time I have anxiously watched the parts of the hive where bee bread has been deposited, and the matured bees *during the*

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night may be observed feeding on the bee bread; indeed almost every cell containing pollen will have a bee half in the cell eating the pollen--the pollen is mixed with honey, and this is likewise done in the night, as the cells containing bee bread fresh brought into the hive may be seen in an afternoon dry and the pellets may be distinguished, but the next morning all traces of such pellets will be gone, and the surface of the pollen in every cell will be smooth and evidently mixed with honey.

The result then of the observations made during the period of two years and a half is the proof of these two facts in bee economy, viz., that the impregnation of the queen extends over more than one season, and that the food of the bee in the grub state is honey, and not farina or pollen. Though these may not be considered very important, yet when they can be asserted not merely as speculative theories, but as clearly demonstrated facts, it must be a further step to the more perfect knowledge of the habits of the insect.

Since the preparation of the Essay, in December, 1852, I have certainly continued the observations with a view to prove the conclusions drawn by me as to the duration of life in the bee. As to the queen, the time of direct observation has not yet been extended sufficiently to add to anything said in the Essay as to her life: as to the drone, in the year 1853 none were brought to perfection, and in 1854 they were killed at the ordinary time as in a common hive; and as to the worker the calculation of the numbers produced, and the state of the hive in the spring, especially at the period when the longest lived bees die off, are so confirmatory of my views as to their duration of life, that I have no hesitation in reiterating, that the maximum period of the life of the worker bee is eight months.

In the winter of 1853-4, I omitted to note the number of dead bees from time to time removed by me—during this present winter I have done so, and I am much inclined to think that great assistance will be obtained thereby in determining positively the duration of their life; but as I have only brought this paper down to the end of the year 1854, I hope on a future occasion to have the pleasure of continuing my history of the observatory hive, and stating at length the result of future observations.

One of the conditions under which the Prize Essay was sent to the Entomological Society being that it *must present the result of original experiments*, it was of course prepared to meet that view: and in continuing the present paper the same course has been followed, and any reference to published works on the subject

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carefully avoided: the history of the experiment has been invariably given before any conclusion is drawn from it, thus accounting for the somewhat egotistical style in which both papers might otherwise appear; still the original Essay and this present paper are in the end, using the words of an eminent member of the Entomological Society, only what they profess to be—"direct observations of fact rather than speculative theories of which there have been too many among Apiarians."

TABLE SHOWING THE ACTUAL NUMBER OF BEES PRODUCED IN THE OBSERVATORY HIVE DURING THE YEARS 1852, 1853 AND 1854.

1852.		1853.		1854.	
Time of measuring Brood.	Number.	Time of measuring Brood.	Number.	Time of measuring Brood.	Number.
August 5	4090	March 14	729	March 17	283
„ 26	2970	April 21	729	April 9	1215
		May 16	1296	„ 30	1215
		June 5	3280	May 21	2430
		„ 26	6912	June 11	4279
		July 16	8316	July 2	10,435
		August 7	2439	„ 28	9099
				August 13	1404
				September 3	972
	7060		23,701		31,332

1852.....	7060
1853.....	23,701
1854.....	31,332
Total of three Seasons.....	62,093

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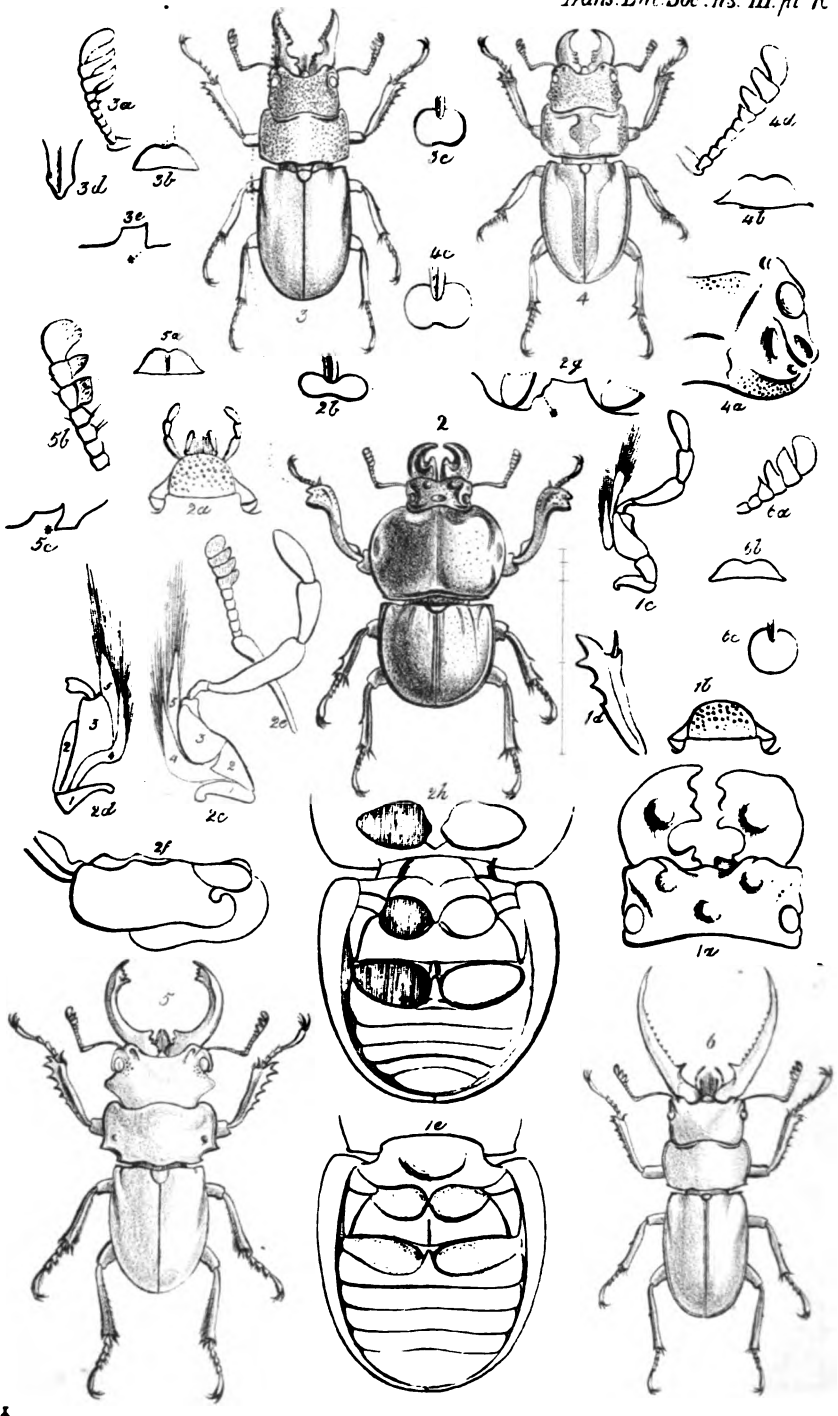

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XX. *Descriptions of some new Species of Exotic* Lucanidæ.

By J. O. Westwood, F.L.S., &c.

[Read 5th February, 1855.]

Having from time to time, since the publication of my memoir upon the distribution of the *Lucanidæ*, in the Annales des Sciences Naturelles for 1834, made drawings and dissections of various remarkable species of that family which have fallen under my notice, and which have possessed characters of an interesting description with reference to the generical division of the family, I beg leave, on the present occasion, to offer them to the Entomological Society, as a supplement to the various memoirs on those insects by Messrs. Hope,* Parry,† Saunders,‡ and myself,§ which have appeared in the Transactions.

SPECIES FROM SOUTHERN AFRICA.

Genus Colophon, Westw. (Ann. Sc. Nat. 1834.)

Of this curious type a single species has hitherto only been noticed, namely—

Sp. 1. *Col. Westwoodii.* (Plate X. fig. 1, details.)

C. Westwoodii, G. R. Gray in Griffith's An. King.; Ins. p. 534, pl. 46, f. 5; Westwood in Ann. Sc. Nat. 2d Ser.; Zool. t. 1, pl. 7, f. 5, with generic details.

Having had an opportunity of making a more minute examination of the type specimen of this insect in Mr. Hope's Collection, I am able to add the following particulars, for the most part rendered necessary by the discovery of a second still more remarkable species of the genus acquired by Mr. Hope.

The head is transverse, emarginate in the middle of the anterior margin, but with the clypeus slightly advanced over the labrum, which it conceals; it is furnished on the upper side with

* Trans. Ent. Soc. iii. p. 279; iv. pp. 5, 73, 182.
† Ibid. iv. p. 55.
‡ Ibid. ii. p. 177; iii. (N. S.) p. 45.
§ Ibid. iv. p. 275.

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three raised tubercles, one near the inner base of each mandible, and the other in the middle of the hind part of the crown of the head. The mandibles are about the length of the head, very robust, curved, each with a raised tubercle in the middle, on the upper side, and the apex broadly and transversely truncate, with two or three obtuse short teeth: the base of each is internally prolonged on the under side, next the mentum. The prothorax is broader than the elytra, the sides rounded, its widest part being behind the middle, and its hinder lateral angles prominent and acute; its upper surface is thickly covered with minute punctures. The elytra are nearly round, with the fore part truncated and straight; they are smooth and convex, and but slightly polished. The fore legs are robust, but of the ordinary form; the tibiæ with three teeth on the outside, the first and second small, the third subapical and large, as is also the apical point.

Plate X. fig. 1 *a*, head seen from above; 1 *b*, mentum and base of maxillæ from beneath; 1 *c*, maxilla and palpus; 1 *d*, anterior tibia; 1 *e*, meso- and metasternum and abdomen seen from below.

Sp. 2. *Colophon Thunbergii*, Westw. (Plate X. fig. 2.)

Niger, tenuissime punctatus; pronoto maximo, antice utrinque retuso, angulis posticis obsoletis, mandibulis magnis falcatis intus dente porrecto armatis; tibiis anticis extus curvatis, apice spatulato-dilatatis (mas).

Long. corp. lin. 11½; mandibul. lin. 1½; pronoti lat. lin. 6½; elytror. lat. lin. 5⅔.

Habitat in Caffraria?

In Mus. Hope.

Caput breve, transversum, angulis anticis lateralibus subobtusis, margine antico in medio subemarginato; clypeo haud prominulo, tuberculo utrinque versus basin internum mandibulæ singulæ armato, impressioneque media transverso-ovali inter oculos instructo. Oculi antice septo emarginato-incisi; mandibulæ crassæ falcatæ, capite paullo longiores, apice subacutæ; intus, ante medium, dente valido infero alteroque supero porrectis armatæ. Maxillæ longe ciliatæ, lobis duobus acutis rectis. Mentum semicirculare, planum, punctatum. Labium internum, ciliis apicalibus ultra marginem anticum menti productis, palpis labialibus articulo ultimo pone marginem menti exserto. Antennæ articulo 1mo reliquis longitudine æquali, 2ndo minuto, clava 4-articulata. Prothorax maximus,

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latior quam longus, lateribus rotundatis, convexus, medio longitudinaliter canaliculatus, antice utrinque retusus, nitidus, tenuissime punctatus. Scutellum breve. Elytra semi-ovata, prothorace angustiora, convexa, lateraliter marginata, lævia, sub lente tenuissime punctata; singulo striolis duabus subobliquis inter scutellum et humeros. Pedes crassi; antici femoribus brevibus intus sinuatis, tibiis valde curvatis, basi intus parum dilatatis, apicibus subspatulatis bidentatis. Pedes 4 postici longitudine mediocres, tibiis extus pone medium spina unica instructis, apicibus externis acute spinosis. Prosternum simplex, mesosternum obliquum, haud productum.

Plate X. fig. 2, *Colophon Thunbergii* slightly magnified; 2 *a*, mentum and maxillæ in situ; 2 *b*, eye partially incised by the canthus; 2*c*, 2*d*, maxilla seen from above and beneath, showing its component parts; 2 *f*, base of fore leg; 2 *g*, prosternum and base of mesosternum; 2 *h*, pro- meso- and metasternum, and hind part of the body, seen from beneath.

I have seen but a single specimen of this very remarkable insect, which entirely recedes from the general appearance of the species of this family, and still more strongly than the type recalls to mind the genus *Lethrus*. The specimen in question is certainly a male, and it might perhaps, at first sight, be supposed to be the opposite sex of the specimens of *Col. Westwoodii*, with which we are acquainted; but the structure of the head and mandibles of the latter, as well as the large pronotum, seem sufficiently to prove that they also are males of a distinct species.

SPECIES FROM ASIA.

Sp. 3. *Lucanus Thibeticus*, Westw. (Plate X. fig. 3.)

Elongatus, subparallelus, convexus, niger, elytris subcastaneis nitidis, in medio subæneis, capite et pronoto tenuissime granulatis, mandibulis planis, longe porrectis apice acutis, dimidio apicali serrato; pedibus gracilibus (mas).

Long. corp. lin. 14; mandib. lin. 4.

Habitat in Thibeta.

In Mus. Parry.

Caput subquadratum, lateribus fere rectis; antice late emarginatum; supra tenuissime granulatum: mandibulæ maris capitis longitudine, porrectæ, planæ, apice parum elevatæ, dimidio apicali intus obtuse serratæ; ante medium profunde emarginatæ, basique obtuse dentatæ. Antennæ articulo 6to

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intus acuto, 7mo acuto, seta longa instructo, tribus apicalibus longe perfoliatis. Oculi septo parum incisi. Mentum subtriangulare, antice truncato-emarginatum. Prothorax transversus, capite latior, lateribus fere rectis, dorso tenuissime granulato medio sublævi. Elytra elongata, latitudine prothoracis, lævia nitida. Pedes graciles, tibiæ anticæ intus in medio subsinuatæ, extus serrulatæ denticulisque 5 majoribus, dentibusque duobus apicalibus armatis; intermediæ in medio extus spina minuta armatæ; posticæ simplices. Prosternum angulatum, apice obconicum.

Plate X. fig. 3, *Lucanus Thibeticus*, magn. nat.; 3 *a*, antenna; 3 *b*, mentum; 3 *c*, eye seen sideways; 3 *d*, prosternum seen beneath; 3 *e*, pro- and mesosterna seen sideways.

This species bears a certain amount of resemblance to the Madagascar species *L. serricornis*, and it is remarkable for its nearly parallel form and slightly æneous glossy elytra.

Sp. 4. *Lucanus biplagiatus*, Westw. (Plate X. fig. 4.)

Niger, capite postice obscure rufo, pronoto fulvo-rufo, medio lateribusque obscuris; elytris nigris, singulo plaga lata laterali fulvo-rufa; capite utrinque pone oculos tuberculo armato, mandibulis maris latis, capite brevioribus intus basi obtuse denticulatis, apice acuto, tibiis 4 posticis ante apicem constrictis (mas et fem.)

Long. corp. maris lin. 13; mandibul. lin. $2\frac{1}{2}$.

Habitat in Thibeta.

In Mus. Brit., Parry et Westwood.

Mas.—Caput prothorace parum angustius, transversum, margine antico in medio profunde emarginato, angulis anticis oblique rotundatis, lateribus pone oculos tuberculo obtuso instructis; fuscum sub lente granulosum, versus latera punctis rotundatis. Mandibulæ latæ capite breviores, apice acutæ curvatæ, basi intus dentibus tribus obtusis armatis. Labrum inter basin mandibularum porrectum. Oculi septo fere dimidiatim divisi. Mentum breve, subtriangulare, antice subemarginato-truncatum. Caput infra pone oculos, tuberculis striolisque obliquis profunde impressis notatum. Antennæ 10-articulatæ, articulo 7mo intus acute producto et 8vo fere dimidio minori. Prothorax transversus, lateribus subrectis, angulis posticis oblique rotundatis; supra lævis, nitidus, lateribus punctis rotundatis, fulvo-rufus, medio irregulariter

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lateribusque nigris. Elytra prothoracis latitudine, lævia, nitida, nigra, singulo fascia lata (versus humeros attenuata), rufo-fulva. Pedes fulvo-rufi, femorum apice, tibiarum basi et apice, tarsisque nigris; tibiæ anticæ extus serrulatæ, denticulisque circiter 8 majoribus dentibusque duobus apicalibus armatæ; intermediæ extus in medio dente minuto, et ante apicem constrictæ, angulo apicali externo acuto; posticæ extus inermes, intus prope apicem subconstrictæ, tuberculoque obtuso ante constrictionem instructæ. Corpus infra nigrum, abdomine et lateribus metasterni piceis.

Fœmina.—Nigra, pronoto utrinque vitta lata, elytrisque plaga lata laterali rufo-fulvis; capite supra rugoso; angulis anticis oblique truncatis, tuberculo pone oculos parum distincto; pronoto punctatissimo, punctis versus latera majoribus; elytris punctatissimis, dorso versus suturam lævi; pedibus nigris, tibiis quatuor posticis ante apicem haud constrictis, singula prope medium spina minuta externe armata.

Plate X. fig. 4, *Lucanus biplagiatus*; mas, natural size; 4 *a*, half of the head seen beneath, without the mandibles, showing the lateral impressions behind the eyes; 4 *b*, mentum; 4 *c*, one of the eyes seen laterally; 4 *d*, antenna.

This species is remarkable, not only for the peculiarity of its coloration, but also from the curious manner in which the four posterior tibiæ are constricted just before the apex,—in which respect it agrees with *Lucanus inquinatus*, figured in my Cabinet of Oriental Entomology, pl. 8, fig. 4, of which species both sexes are contained in the Cabinet in the British Museum. It is indeed unquestionably closely allied to that species, but I should conceive the striking difference in the structure of the mandibles of the males, as well as the colouring, must be assumed to indicate a decided specific distinction.

Sp. 5. *Odontolabris Evansii.* (Plate X. fig. 5.)

Niger, subnitidus, capite antice concavo, lateribus pone oculos tuberculo lato instructis; mandibulis capite paullo longioribus falcatis, apice truncato-denticulatis; pronoto latissimo, angulis posticis emarginatis; tibiis anticis extus 6-dentatis, tarsis subtus spongiosis tibiisque posticis ad apicem pilis fulvis striatis (mas).

Long. corp. lin. 15; mand. lin. 5.

Habitat in China.

In Mus. Evans.

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An var. *Odont. emarginatus* (Reiche), W. W. Saunders, Ent. Trans. N. S. iii. p. 49?

Mas.—Niger, subnitidus, præsertim in disco elytrorum. Caput latum, antice concavum, margine antico late emarginato, lateribus pone oculos tuberculo magno instructis; angulis anticis oblique truncatis; vertice sub lente tenuissime granulato, punctis nonnullis majoribus prope oculos. Mandibulæ capite parum longiores, falcato-curvatæ, apice oblique truncato, denticulato basique obtuse dentato. Antennæ articulo 6to subquadrato, intus in angulum parvum setiferum producto; 7mo paullo majori, intus suboblique truncato; 8vo transverso, intus oblique truncato; 9no subacuto; 10mo subrotundato. Oculi septo in duas partes divisi. Caput infra fere planum, genis parum concavis et profunde punctatis. Prothorax capite paullo latior, lateribus et postice tenuissime marginatus, disco subgranulato, punctoque majori in medio laterali, angulis posticis profunde emarginatis, emarginatura spina antice et postice terminata. Elytra sub lente vix granulosa; convexa, parum nitida; prothorace paullo angustiora. Pedes longi, antici tibiis sat latis, extus 6-dentatis, apice intus setoso, spinaque brevi curvato armato: tibiæ intermediæ et posticæ extus inermes apice externo acuto, intus ad apicem striolis setarum lutearum instructæ, tarsi subtus luteo-spongiosi. Prosternum postice porrectum, subacutum, mesosternum inerme obliquum.

Plate X. fig. 5, *Odontolabris Evansii* of the natural size; 5 *a*, mentum; 5 *b*, antenna; 5 *c*, pro- and mesosterna.

I have only seen a single specimen of this species, represented in the plate, in the Collection of W. F. Evans, Esq., M.E.S. It is certainly very nearly allied to *Odontolabris emarginatus*; but, as a large and fully developed example of the male of that species was selected for the figure given in a former part of these Transactions, I can hardly think that the present insect can be considered as a modification of the male form of *O. emarginatus*, and shall, therefore, regard it as distinct until its identity be proved by a series of links establishing the chain between the two forms.

Sp. 6. *Cladognathus piceipennis.* (Plate X. fig. 6.)

Niger, sub lente tenuissime granulosus, elytris obscure castaneis, corpore infra cum pedibus magis castaneis; mandibulis valde

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elongatis, intus denticulatis, denteque majori inter basin et medium posito, prothoracis angulis posticis spina parva porrecta armatis, tibiis anticis extus serrulatis denticulisque majoribus, dentibusque duobus apicalibus armatis (mas).

Long. corp. lin. 14; mandib. lin. 8.
Habitat in China vel Thibeta.
In Mus. D. Parry.

An var. *Cladogn. gracilis*, W. W. Saunders, Ent. Trans. N. S. iii. p. 47?

Mas.—Oblongus, gracilis; mandibulis, capite et pronoto nigris et sub lente tenuissime granulatis, granulis valde contiguis. Caput transversum, lateribus fere rectis, angulis anticis subobliquè subtruncatis. Labrum porrectum. Mandibulæ valde elongatæ, graciles, apice acutæ; intus prope basin dente unico, margineque interno denticulis novem vel decem armatis. Antennæ articulo 7mo intus in angulum acutum setiferum producto, 8vo et 9no intus subobtusis, mentum latum antice multo angustius et in medio emarginatum. Oculi partim septo incisi. Prothorax transversus, capite parum latior, lateribus subrotundatis, angulis posticis in dentem parvum productis. Elytra prothoracis latitudine, angulis humeralibus acutis; sub lente punctis minutis oblongis ad basin impressa, dimidio postico fere lævi, nigra, obscure castaneo (præsertim pone medium) tinctæ. Pedes graciles, tibiæ anticæ extus serrulatæ denticulis majoribus æquidistantibus dentibusque duobus apicalibus armatæ, tibiæ intermediæ spina distincta extus in medio armatæ; posticæ tuberculo minutissimo medio. Corpus infra et pedes castanei, his supra obscurioribus; tarsorum articulis 4 basalibus dense luteo-setosis.

Plate X. fig. 6, *Cladognathus picipennis*, of the natural size; 6 *a*, terminal joints of the antennæ; 6 *b*, mentum; 6 *c*, eye partly incised by the septum.

This species is closely allied to *Cl. Spencii* (Hope), and especially to *Cl. gracilis*, of which last it may possibly be regarded as an extreme form of the male; but, as in the last species, until connecting links be produced, I must retain the opinion of the propriety of regarding it as a distinct species.

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SPECIES FROM SOUTH AMERICA.

The geographical distribution of the *Lucanidæ* in South America is extremely interesting, exhibiting to us a series of types quite peculiar to that portion of the world. Whilst North America presents an European tendency in possessing species of such genera as *Ceruchus*, *Platycerus*, *Lucanus* proper (*L. Elephus*, *L. capreolus*, (*Dama*, F.) *L. lentus*), and *Dorcus* (*D. parallelus*), South America* maintains a far more exclusive character in its representatives of this family. The *Leptinopteri* (Hope, *Psaliceri* Dej., *Psalidostomi* Burm.), *Macrocrates* (*M. bucephalus*, Kl.), *Scortizus* (Westw.), and the *Sclerostomi* (Burm.), are exclusively South American types of isolated structure. *Hexaphyllum Brasiliense* and *Westwoodii*, it is true, approach nearly to the Australian *Syndesus cornutus*, and the South American *Chiasognathus*, *Sphenognathus* and *Orthognathus*,† are most nearly allied to *Rhyssonotus*, as is also *Pholidotus* to *Lamprima*.

We thus arrive at the remarkable conclusion that, in this family, the productions of South America are most nearly allied to those of Australia,—a fact, however, which is confirmed by various other instances, especially in groups of anomalous form, such as the *Rhipiceræ*, *Pseudomorphæ* and *Helæi* among the *Coleoptera*, and the *Thynnidæ* among the *Hymenoptera*.

Another Brazilian genus belonging to the *Lucanidæ*, of considerable interest and great rarity, is

Streptocerus;

the only known species of which, *S. speciosus*, a native of Chili, is described by M. Léon Fairmaire in the Annales de la Soc. Ent. de France, 1850, p. 53, pl. 1, f. 2, the male of which is in the Collection of the Marquis de la Ferté, and the female in that of M. Chevrolat. A second specimen of the female was brought from Chili by J. Miers, Esq., F.R.S., &c., who has kindly placed it in my hands for examination. A good figure of the male having been given by M. Fairmaire, I have not thought it necessary to refigure it; but, as the representation of the head of the female, given by M. Fairmaire, is inaccurate in several respects, and as he has given no analysis of its organs, I have represented them in the accompanying figures (Pl. XI. fig. 1, and details). The antennæ in this sex (fig. 1) are represented by M. Fairmaire as

* *Dorcus*, according to Burmeister, is found in all quarters of the world except South America.

† Burmeister suggests that *Orthognathus albo-fuscus* of Blanchard (D'Orbigny, Voy. Am. Mérid. Ins. pl. 12, fig. 7) is probably a *Sclerostomus*.

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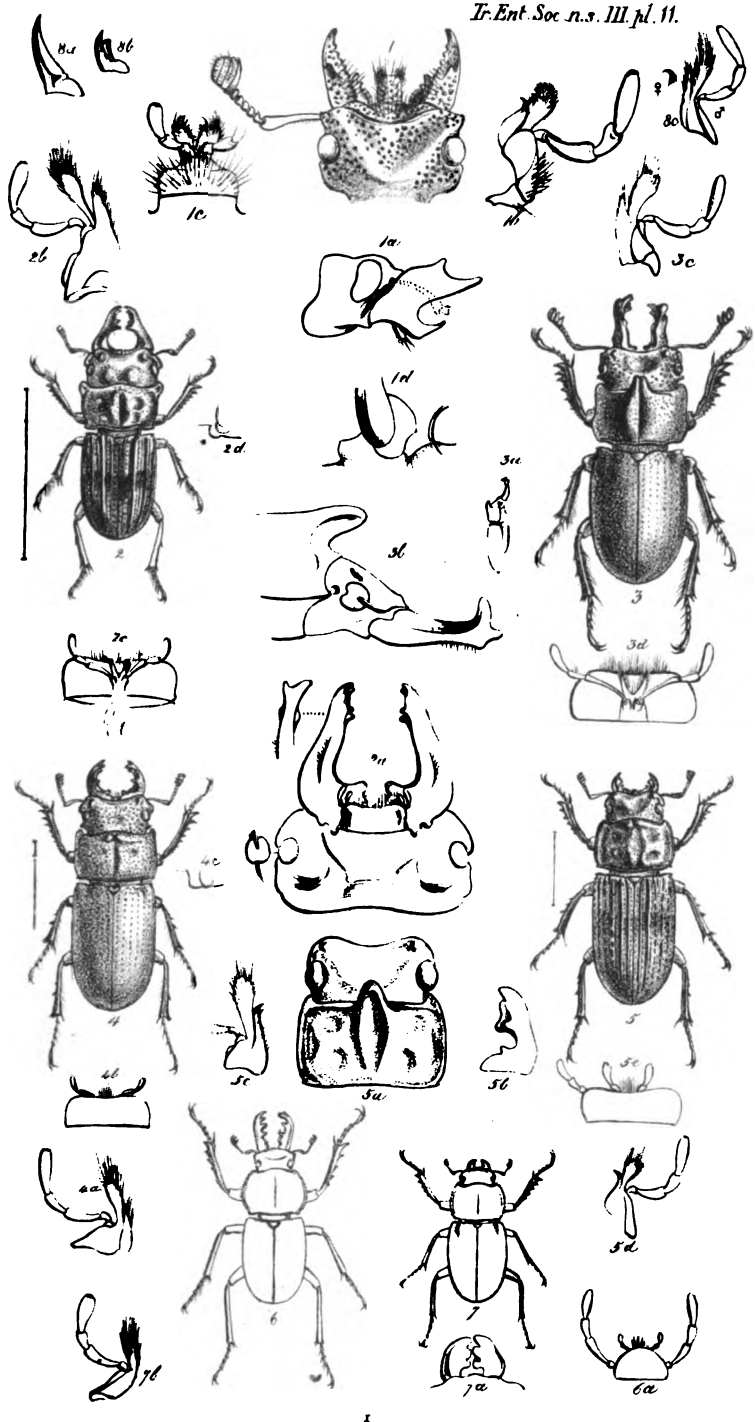

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having only a 3-jointed club, whereas it is distinctly 4-jointed. the basal joint of the club being even slightly longer than the following. The labrum is small, oblong, slightly porrected. In fig. 1, the head is purposely represented raised in front, to show the labrum extended between the base of the mandibles; in fig. 1 *a*, the setose extremity of the labrum is shown rather too much deflexed, its natural position in repose being to rest upon the internal flattened base of the closed mandibles; it is strongly punctured, bristly, and armed at each interior angle with a thick fascicle of setæ. This, I presume, is the part described by M. L. Fairmaire as "l'épistome, presque perpendiculaire, en forme de languette, légèrement creusé en cuillière à son extrémité, qui se termine par une petite pointe;"—a description not applicable to the female, being probably made from the male. The maxilla, of which M. L. Fairmaire gives no description, are, in the female (fig. 1 *b*), armed with a curved hook at the extremity of the inner lobe; the male, as in the *Lamprimæ*, &c., have this part most probably unarmed. The lower lip and its appendages, also undescribed by M. Fairmaire, are especially interesting, as disagreeing with that of the majority of the family, the lobes of the labium and the base of the labial palpi arising from the extremity of the mentum (fig. 1 *c*). The pro- and meso-sternal processes (fig. 1 *d*) are simple.

M. L. Fairmaire, without noticing the above peculiarities, upon which the relation of the groups of *Lucanidæ* are so greatly dependent, has, with great tact, asserted the relation of the genus *Streptocerus* with the Australian *Lamprimæ*, with which, indeed, it agrees in the porrected labrum and labial palpi, and uncinated maxillæ of the female; it especially, however, differs from that genus in the distinct and porrected labrum, 4-jointed club of the antennæ, and other characters. In the distinct labrum, and in the porrected labium and labial palpi affixed at the apex of the mentum, the genus also approaches *Sinodendron*, which, in these respects, is thus proved neither so exceptional nor so far removed from the terminal *Lucanidæ* as is indicated by Professor Burmeister in his table of the family (Handb. d. Ent. v. p. 315).

Sp. 7. *Sclerostomus hastatus.* (Plate XI. fig. 2.)

Obscurus, capite piceo, pronoto elytrisque subcastaneis, his costis duabus castaneo-rufis nitidis instructis, sutura fasciaque transversa submedia nigra notatis; mandibulis elongatis compressis, apice digitato, 4-denticulatis, prothoracis angulis anticis extus dilatatis (mas).

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Long. corp. lin. 9; mandib. fere lin. 2; lat. prothoracis antice lin. 4.

Habitat in Americæ meridionalis partibus centralibus.

In Mus. Deyrolle, Parisiis.

Mas.—Caput latum, transversum, antice late emarginatum, angulis anticis oblique truncatis, et in lobum depressum utrinque dilatatis, postice oculos dimidiatim dividentibus; vertice utrinque tumido discoque utrinque pone oculos impressione rotunda notato. Mandibulæ capite paullo longiores subrectæ, apice subauriculatæ vel potius subdigitatæ, basi intus in dentem obtusum productæ. Maxillæ lobis elongatis obtusis dense setosis. Mentum transversum, antice parum emarginatum, ciliatum, angulis anticis lateralibus rotundatis. Labrum lobis duobus gracilibus setosis. Palpi labiales graciles, articulo 1mo longo, 2ndo breviori, 3tio paullo crassiori. Antennæ breves, articulis 2-7 fere æqualibus, 8vo, 9no et ultimo intus acutis. Prothorax transversus, antice capitis latitudine, postice sensim angustior, medio marginis antici elevato et paullo prominenti, disco in medio canaliculato impressioneque profunda rotunda inter medium et angulos anticos, his porrectis, angulis posticis acutis. Elytra prothorace paullo angustiora, angulis anticis acuminatis disco subconvexo, singulo costa valida nitida longitudinali submedia instructa striisque simplicibus impressis, interstitiis inter strias punctatis. Pedes graciles, tibiæ anticæ serrulatæ, dentibus 7 vel 8 majoribus (sensim versus basin magnitudine decrescentibus) armatæ, intermediæ spina parva media alterisque 2 vel 3 minutis inter medium et basin; posticæ spina media unica; tarsorum articulis subtus setosis. Corpus subtus nigrum, nitidum, punctatum, prosterno punctatissimo.

Plate XI. fig. 2, *Sclerostomus hastatus* slightly magnified; 2 *a*, the head seen beneath; 2 *b*, maxilla; 2 *c*, mentum seen from within the mouth; 2 *d*, prosternum seen sideways.

This species is remarkable, not only on account of the curious form and sculpture of its head, mandibles and prothorax, but also for its colouring (which is quite unusual in the present family), and for the strong costation of its elytra. It appears to be closely allied to *Scl. plagiatus*, Burm. Handb. d. Ent. v. 425. I have seen but a single specimen of the male, in the rich Collection of M. Deyrolle, of Paris.

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Sp. 8. *Sclerostomus Neotragus*, Westw. (Plate XI. fig. 3.)

Niger, opacus; capite transverso, utrinque pone oculos dente parvo armato; mandibulis porrectis, fere rectis, apice auriculatis, pronoto cucullato (mas).

Long. corp. lin. 5; mandib. lin. 1.
Habitat in Brasilia, St. Paul.
In Mus. Deyrolle, Parisiis.

Caput transversum, tenue varioloso-punctatum, medio verticis minus punctato et excavatione rotunda haud profunda impresso, tuberculo elevato utrinque prope basin mandibularum, angulis anticis oblique truncatis; lateribusque pone oculos spina parva utrinque porrecta armatis. Oculi cantho dimidiatim incisi, antennarum clava 3-articulata. Mandibulæ porrectæ fere rectæ, capite paullo longiores; supra acute carinatæ, apicibus dilatatis crassis auriculatis, dentibus apicalibus intus extensis. Maxillæ maris lobis duobus longe ciliatis, interno simplici. Mentum transversum, angulis anticis rotundatis; laciniarum labii apicibus, articuloque ultimo palporum labialium tantum expositis. Pronotum capite paullo latius et longius, angulis anticis obtusis; lateribus pone medium paullo dilatatis; disco tenuissime punctato, fossula sat profunda mediana longitudinali; margine antico cucullato; *i. e.* in medio in cornu porrecto producto, apice nitido. Elytra brevia, apice rotundato; singulo striis circiter 7 punctorum parvorum irregulariter digestis. Pedes mediocres: tibiæ anticæ serrulatæ, dentibusque 6 majoribus armatæ: intermediæ dentibus tribus, 3tio majori in medio tibiæ posito: posticæ dentibus duobus. Corpus infra nitidum, punctis minutis vage sparsis notatum.

Plate XI. fig. 3, *Sclerostomus Neotragus*, magnified; 3 *a*, natural size; 3 *b*, head and front of prothorax seen sideways; 3 *c*, maxilla; 3 *d*, mentum seen within, showing the labium and labial palpi.

This remarkable species is unique, in the Collection of M. Deyrolle, of Paris, who has on all occasions allowed me an unlimited use of any of his unique and interesting species. It agrees with the Chilian species *Dorcus cucullatus* of Blanchard, in the cucullated front of the pronotum, but differs in the form of the mandibles, unicolorous surface of the body, &c.

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Sp. 9. *Sclerostomus Ditomoides*, Westw. (Pl. XI. fig. 4.)

Ater, opacus ; capite vage punctato, utrinque biangulato, mandibulis maris curvatis, fere capitis longitudine curvatis dentatis; pronoto transverso in medio longitudinaliter subcanaliculato punctatissimo, elytris punctis minutis in strias dispositis.

Long. corp. lin. 5; mandib. lin. 1.
Habitat in Brasilia, apud Rio Janiero.
In Mus. D. Miers.

Parvus, sub-depressus, sub-paralellus, opacus. Caput transversum, in medio subplanum obliquum, disco varioloso-punctato, punctis versus latera postica majoribus, margine antico emarginato, utrinque ad basin mandibularum tuberculo elevato nitido instructo, angulis anticis obliquis; postice in canthum angulatum oculorum productis, lateribus capitis pone oculos etiam in angulum porrectis: oculi septo dimidiatim incisi. Labrum parvum, semicirculare, ciliatum, perpendiculare, supra clypeo occultum. Mandibulæ fere capitis longitudine curvatæ, apice subtridigitatæ, medioque intus spina obtusa brevi armatæ. Maxillæ parvæ, lobis simplicibus longe penicillatis, interno inermi. Mentum transversum, angulis anticis rotundatis; laciniarum labialium penicillis palporumque articulis duobus apicalibus detectis. Prothorax transversus, tenuissime punctatus; capite latitudine paullo latiori, angulis anticis porrectis obtusis; posticis obliquis dorso in medio sub-canaliculato, antice in tubercula dua parum distincta elevato, impressionibusque duabus dorsalibus parvis transversis vix distinctis notato. Scutellum breve nitidum. Elytra opaca, basi punctata punctisque minutis in strias 6 longe ante apicem obliteratas dispositis. Pedes graciles, tibiæ anticæ serrulatæ spinisque sex acutis armatæ; intermediæ spina mediana alterisque 2 vel 3 sub-basalibus minoribus; posticæ spina mediana alteraque sub-basali vix distincta armatæ. Corpus infra nitidissimum, vix punctatum. Prosternum simplex.

Plate XI. fig. 4, *Sclerostomus Ditomoides*, magnified; 4 *a*, maxilla; 4 *b*, mentum and labial palpi; 4 *c*, simple prosternum.

I have seen only a single specimen of the male brought from Brazil by J. Miers, Esq., F.R.S., &c.

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Sp. 10. *Sclerostomus costatus.* (Pl. XI. fig. 5.)

Supra opacus, piceo-niger, pronoto et elytris obscure sanguineo-notatis; punctatus, capite tuberculo nitido utrinque ante oculos posito; pronoto canali lato medio parum profundo, et utrinque impressionibus duabus rotundatis, antica minus distincta, impresso; medio marginis antici in mare in tuberculum elevato; elytris costatis, costis interrruptis, 2da e sutura crassiori; interstitiis seriatim punctatis; tibiis anticis spinis 6 parvis obtusis; intermediis 1 media alterisque duabus subbasalibus; posticis 1 media alteraque minutissima subbasali armatis.

Long. corp. lin. .

Habitat in Brasilia.

In Mus. Miers et Hope.

Sclerostomus costatus, Burmeister, Hand. d. Ent. vol. v. p. 426; Hope, Ca. Lucanidæ, p. 27 (*Sclerognathus c.*)

Plate XI. fig. 5, *Sclerostomus costatus*, fem. magnified; 5 *a*, head and pronotum of the male; 5 *b*, mandible of the male; 5 *c*, maxilla of male; 5 *d*, maxilla of female; 5 *e*, mentum and palpi.

The male of this curious Brazilian insect is distinguished by the cucullated front of the prothorax, which in both sexes is deeply impressed along the centre, with lateral circular impressions. I am indebted to Mr. Miers for an opportunity of describing this species, which was collected by him during his residence in Brazil. It will be observed, from the figures of the maxillæ, that the inner lobe in both sexes is armed with an acute curved spine, which would remove it from the section of the family in which the genus is placed by Burmeister.

Sp. 11. *Sclerostomus femoralis.* (Pl. XII. fig. 9 *a*, 9 *b*.)

Dorcus femoralis, Guérin-Meneville, Rev. Zool. 1839, p. 303, (descriptio trivialis, structura insecti omnino neglecta).

Lucanus rubripes, Hope, Cat. Lucan., p. 26; Burmeister, Handb. d. Ent. v. p. 424 (*Sclerostomus r.*)

This interesting species from the Straits of Magellan is placed by Burmeister as one of the two species of his first section of the genus *Sclerostomus*—his other species being the *L. Darwinii* of Hope, which is so closely allied to the former that they are regarded as probable varieties of one species. Hence there seems

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to be no doubt that these are to be regarded as the types of the genus *Sclerostomus;* which is important to be borne in mind when the structure of the maxillæ is examined. The *Lamprimadæ* of Burmeister, in which sub-family the genus is placed by that author, is especially distinguished by the free upper lip, and by the membranous inner lobe of the maxillæ of the males, whilst it is corneous and uncinated in the female; but in the species before us the male, whilst it has the upper lip large, free and horizontally porrected, has the inner lobe of the maxillæ uncinated, which character would remove the species (and of course the genus also) to the sub-family of *Figulidæ* of Burmeister, in which the inner lobe of the maxillæ of both sexes is uncinated. In the males of *Sc. hastatus*, *Neotragus* and *Ditomoides*, as we have seen above, this inner lobe of the maxillæ is simple, straight and ciliated, but in the *Sc. costatus* it is, as in *Sc. femoralis*, uncinated in both sexes. These considerations will probably require a modification of the genus, and possibly the establishment of a new genus amongst these small South American *Lucanidæ*.

Plate XII. fig. 9 *a*, represents the mandible of the male of *Sc. femoralis*, and fig. 9 *b*, the maxilla of the same sex.

Sp. 12. *Scortizus maculatus*, Klug. (Plate XI. fig. 8 *a*—8 *c*.)

Lucanus maculatus, Klug, Specimen alt. Ent. Bras. in Nova Act. xii. 2, 432; Burmeister, Handb. d. Ent. v. p. 422 [Scortizus m.]

Pholidotus irroratus, Hope, Trans. Zool. Soc. i. 100, pl. 14, fig. 3.

Scortizus irroratus, West. Annales Sci. Nat. Sec. Ser. i. 119.

The female of this pretty little insect is figured by Mr. Hope from my drawing in the Transactions of the Zoological Society, together with the structural details, whence it appears that the labrum is small, semicircular and ciliated, and the inner lobe of the maxillæ uncinated and horny. Both sexes were brought from Brazil by J. Miers, Esq. F.R.S. (to whom I am indebted for a specimen of the female). The male has the head and prothorax considerably wider than in the female, and the hind legs are less strongly spined. The mandibles in this sex (fig. 8 *a*) are as long as the head and acute, whilst they are much shorter in the female (fig. 8 *b*), with a strong tooth on the inside. The maxillæ of the male (fig. 8 *c*) has the inner lobe simple and penicillated, whilst it is uncinated and horny in the male. The eyes are but slightly incised in the anterior part by the canthus.

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SPECIES FROM NEW HOLLAND AND NEW ZEALAND.

Sp. 13. *Cacostomus squamosus.* (Pl. XI. fig. 6 ♂, fig. 7 ♀.)

The first notice of this interesting genus was given by Mr. Newman, in Charlesworth's Magazine of Natural History, vol. iv. p. 364, July, 1840, where it was thus characterized from the male sex alone:—"Dorci facies at corpore squamoso et mandibulis aliter dentatis plane discrepat."

In the English observations, the small anteriorly angulated head, the entirely divided eyes, the form of the mandibles, the ordinarily-formed ten-jointed antennæ, the convex prothorax, with crenated lateral margins, and the pilose undersurface of the joints of the tarsi were noticed.

The type specimen was received by Mr. Bowerbank from Sydney, but Mr. Newman considered it to be a native of Assam, or some other neighbouring region of continental Asia.

In the Annals of Natural History, vol. 8, p. 124 (October, 1841), I published the descriptions of both sexes of the same insect from the collections of Messrs. Melly and Curtis (by both of whom it had been received from Australia), under the name of *Lepidodes rotundicollis*, with the following generic character:—

Corpus punctatum, punctis albido-squamosis. Caput maris magnum quadratum; mandibulis crassis porrectis, subrectis, intus et ad apicem valde dentatis. Prothorax subrotundatus lateribus crenulatis; oculis omnino septatis; antennarum clava triphylla; tibiæ anticæ 5-dentatæ, 4 posticæ inermes.

The male is 14, and the female 10 lines long.

The original specimen described by Mr. Newman having been acquired by the British Museum Collection, I have been enabled to ascertain its identity with the insects described by myself, the relationship of the two insects having been suggested by the late Dr. Erichson in Wiegmann's Archives for 1842, ii. 234, and referred to by Dr. Burmeister, Handb. d. Ent. v. p. 362, with an incorrect reference to the Annals, instead of the New Series of the Magazine of Natural History. In the squamose surface of the body, as well as in its elongated limbs, this genus approaches *Pholidotus* and *Scortizus irroratus*, but both these genera have the mando of the maxilla hooked. It also bears some relationship to *Calcodes æratus*, W. Perhaps, however, its nearest ally is *Rhyssonotus*, K., which has the eyes entirely divided, as well as the mando in both sexes simple; but that genus differs at once in the velvet-like upper surface of the body, the structure of the man-

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dibles, and especially the gradually-formed six-jointed club of the antennæ.

No figures having been hitherto published of the genus, I have added outlines of both sexes and details in the accompanying plate.

Fig. 6, *Cacostomus squamosus*, male, mag. nat. 6*a*, maxillary palpi, mentum and labial palpi of the male.

Fig. 7, female, mag. nat., 7 *a*, mandibles; 7 *b*, maxilla.*

Sp. 14. *Sclerostomus caviceps*, Westw. (Plate XII. fig. 6, mas; fig. 7, fœm.)

Piceus, obscurus, capite et pronoto maris nitidioribus, irregulariter punctatissimis, elytris costis tribus elevatis parum distinctis, capite maris magno profunde excavato, pronoto antice dilatato subcucullato.

Long. corp. maris cum mandibulis lin. 8; fœminæ 6.

Habitat in Nova Zealandia.

In Mus. Westw.

Mas.—Piceus vel potius nigro-castaneus, punctis luteo-villosis. Caput magnum, latitudine elytrorum glabrum, punctatissimum, vertice excavatione magna, totum occiput includente, notato, tuberculo utrinque prope basin mandibularum terminato; angulis anticis lateralibus rotundato-deplanatis oculos fere omnino cantho dividentibus; lateribus pone oculos rotundato-dilatatis. Labrum parvum, transversum, angulis lateralibus rotundatis, ciliatum punctatum. Mandibulæ crassæ curvatæ, capite paullo breviores compressæ, margine infero dentibus tribus obtusis; supero in dentem latum apicalem ampliato. Antennæ breves, clava 3-articulatæ; maxillæ parvæ setosæ, mandone inermi. Mentum semicirculare, grosse punctatum, Prothorax magnus, antice dilatatus, margine antico porrecto elevato, punctatissimus, dorso in medio longitudinaliter impressus, impressione punctis majoribus et fere conjunctis, lateribus subsinuatis; angulis anticis et posticis vix acutis. Scutellum parvum, semicirculare. Elytra brevia, subconvexa, punctatissima, punctis interdum confluentibus, angulis anticis lateralibus extus paullo porrectis, singulo costis tribus parum elevatis et vix distinctis (præsertm exterioribus). Pedes mediocres, tibiæ anticæ 7-denticulatæ; intermediæ dente

* I have not had an opportunity of examining the maxilla of the male, but as that of the female is simple, without a horny hook, I have no doubt that of the male is equally unarmed.

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minuto medio, posticæ in medio inermes. Corpus et pedes subtus picea, punctata.

Fœmina minor; capite et pronoto magnitudinis ordinariæ, vertice depresso, et utrinque tuberculo magis distincto instructo. Mandibulæ parvæ, apice acutæ, denteque unico intus armatæ. Prothorax lateribus rotundatis, angulis anticis acutis.

Both sexes of this curious species from New Zealand are contained in my own collection. The male is especially remarkable for the broad prothorax, which is porrected in front, and the wide head with a deep circular excavation in the middle. The genera *Scortizus* and *Sclerostomus*, to which this species is most nearly allied, are known only as natives of South America. The general character of the species before us, however, as well as the character of its maxillæ, varying, as it does, in the opposite sexes, seems fully to warrant its reference to the latter of these two genera, thus establishing another instance of the geographical relationship between the objects of South America and Australasia which has been alluded to above.

Plate XII. fig. 6, *Sclerostomus caviceps*, mas, mag. auct.; fig. 6 *a*, maxilla; 6 *b*, eye nearly divided by the canthus; 6 *c*, labrum; 6 *d*, mentum. Fig. 7, ejusdem fœmina, magn. auct.; fig. 7 *a*, maxilla.

The New Zealand genus *DENDROBLAX*, described by Mr. A. White in the "Zoological Volume of the Voyage of the Erebus and Terror," is composed of a single species (*D. Earlianus*, Wh.) and may be regarded as an obscure representative of *Sphenognathus* with the mouth of *Sinodendron*. The species (of which I possess both sexes) is remarkable for having winged males and apterous females.

Lissotes, Westw.

Subgenus novum, *Figulo Nigidio*que affine, mandone maris uncinato, oculis vero integris rotundatis vel subintegris scutelloque minuto subtrigono. Labrum subporrectum, in medio tuberculo conico instructum. Mentum transversum, angulis anticis lateralibus rotundatis margine antico haud emarginato. Labii laciniæ elongatæ, setosæ. Caput transversum, antice late concavum, lateribus haud complanato dilatatis; oculi rotundati, vix cantho antice et postice incisi.

Prothorax margine antico in medio elevato et subporrecto, disco in medio canaliculato vel subdepresso. Tibiæ anticæ extus 6-dentatæ. Prosternum simplex, haud retro porrectum.

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Sect. I.—Mandibulæ maris graciles falcatæ, apice tridentatæ.

Sp. 15. *Lissotes Menalcas.* (Plate XII. fig. 1 and details.)

Niger, nitidissimus, pronoti disco in medio depresso, parum punctatus, elytris striis lævibus impressis.

Long. corp. lin. 11½ (fere 1 unc.).

Habitat in Nova Hollandia. D. Verreaux.

In Mus. Chevrolat (etiam in Mus. Brit.—Nova Zelandia an recte?).

Corpus oblongum, convexum, nitidissimum, parce punctatum; capite lato, prothorace pone medium latiori, elytrisque latitudine æquali. Caput transversum latum, angulis anticis obtusis, vertice late concavo; punctatum, oculi laterales integri rotundati, antice et postice vix cantho incisi, lateribus capitis pone oculos haud dilatatis. Mandibulæ maris capitis longitudine curvatæ, ad basin dente crasso armatæ, apice elevato compresso tridentato. Antennæ breves, clava mediocri, 3-articulata. Prothorax transversus, capite parum latior, præsertim pone medium, medio disci elevato sub-canaliculato, margine antico in tubercula duo elevato; utrinque pone medium impressione rotunda lævi notatus. Elytra brevia latitudine prothoracis, convexa, singulo striis tribus longitudinalibus lævibus, spatiis interstitialibus punctatis. Tibiæ anticæ extus 6-dentatæ, 4 posticæ in medio 1-dentatæ. Fœmina ignota.

This very interesting species forms part of the fine collection of M. Chevrolat of Paris, to whom I am greatly indebted for permission to examine many of the rare species which he possesses. It is remarkable for the subcucullated pronotum and the concave crown of the head, and its glossy black colour. A specimen is also contained in the British Museum collection, which Mr. A. White informs me was received from Captain Parry as a native of New Zealand, whilst M. Chevrolat assures me that his specimen is rightly indicated as a native of New Holland, having been collected by M. Verreaux.

Plate XII. fig. 1, *Lissotes Menalcas* of the natural size; 1 *a*, head and prothorax seen laterally; 1 *b*, the labrum; 1 *c*, the maxilla; 1 *d*, the mentum and extremity of the labial palpi; 1 *e*, the laciniæ of the labium and the labial palpi.

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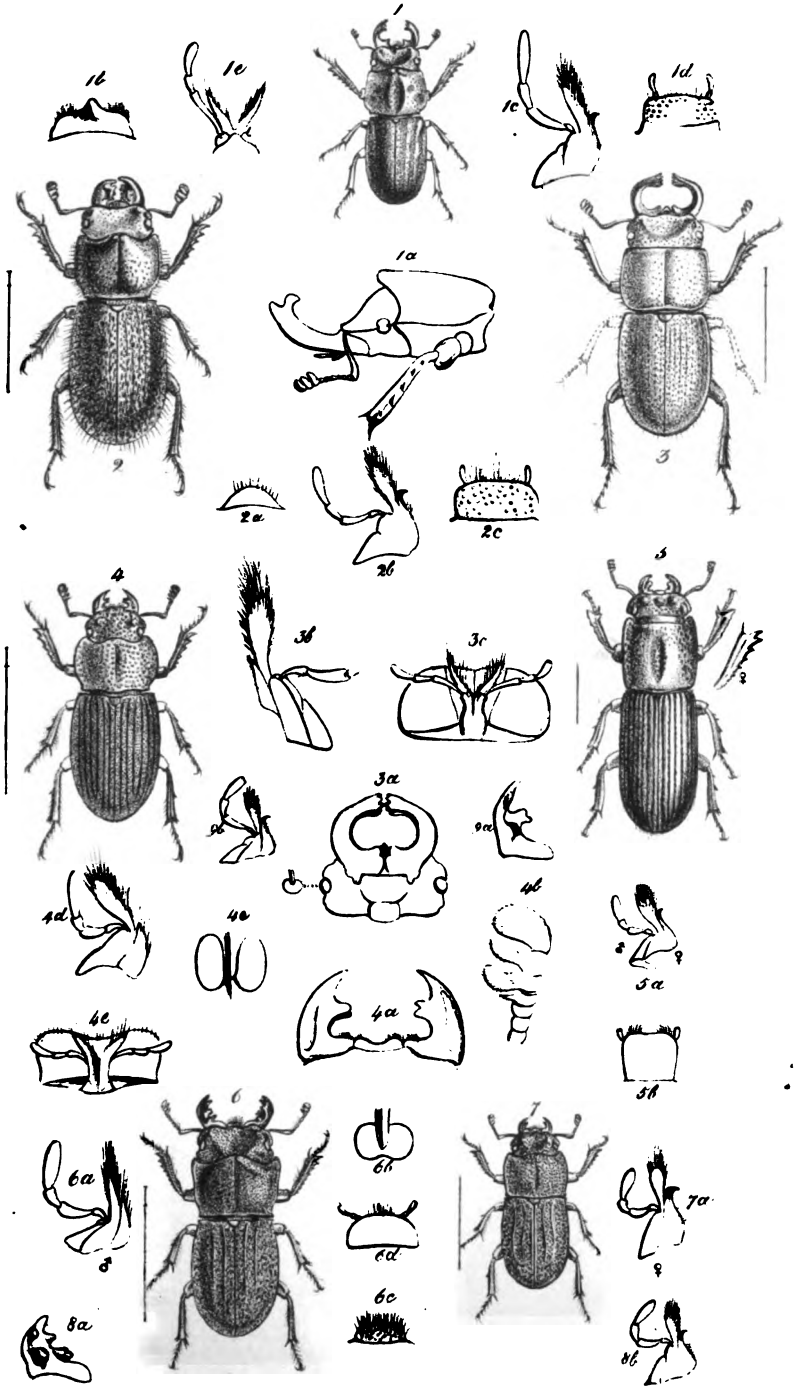

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Sect. II. Mandibulæ maris breviores, intus in medio dente crasso composito armatæ.

Sp. 16. *Lissotes Cancroides.*

Syn. *Lucan. Cancroides*, Fabricius, S. El. ii. 252, 18; Olivier, Ent. i. 1, 18, 12, pl. 4, fig. 11.

Dorcus Cancroides, Westw. Ent. Mag. v. p. 267

Ægus (B.) Cancroides, Burm. Handb. v. 402.

Habitat in Van Diemen's Land.

In Mus. Banks.

Obs.—Dr. Burmeister, probably in consequence of Mr. Mac Leay having observed under the description of his *Ægus chelifer*, "*Lucanum Cancroidem*, Fabricii, haud examinavi, at generi *Dorco* potius pertinere videtur," has given this insect as identical with the *Æg. chelifer*, Handb. d. Ent. v. p. 403. Not only, however, does the specific name as well as its position as the first species in the genus prove that its mandibles agree with the generic description, "porrectæ falcatæ *inermes*," but the figure given by Mac Leay of the maxillæ of *Ægus chelifer*, pl. 1, fig. 7, E, is destitute of a corneous hook. I have not had an opportunity, it is true, of dissecting the typical unique specimen of *Cancroides* in the Banksian Collection, and can only therefore, from its close analogy with the following species, conjecture that the mando of the maxilla of the male is uncinated.

The Australian *Ægus chelifer* of Mac Leay is doubtless more nearly allied to *Ægus acuminatus* and *lunatus*, Weber. This latter species from Sumatra is considered by Dr. Burmeister (l. c.) as identical with my *Æg. falciger* (not *fulviger*) described in the Ann. d. Sci. Nat. Sec. Ser. i. 118.

Sp. 17. *Lissotes subtuberculatus*, Westw.

Niger, prothorace, elytris tibiisque setosis; capite subopaco, vertice late depresso, tuberculo rotundato utrinque versus angulos anticos, prothorace glabro, antice in medio elevato, subtuberculato; elytris punctatissimis, punctis oblongis strias nonnullas irregulares vix formantibus.

Long. corp. cum mandibulis lin. 7½.

Habitat in Nova Hollandia? In Mus. Chevrolat, Parisiis.

Caput transversum, angulis anticis oblique truncatis, postice canthum oculos parum incidentem formantibus; vertice subopaco, haud nitido, depresso, punctis paucis minutis tuberculoque rotundato utrinque versus angulos anticos notato. La-

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brum paullo porrectum, fere semicirculare, setosum; mandibulæ maris capite breviores curvatæ, intus in medio dente lato obtuso e denticulis tribus tuberculoque dorsali truncato composito. Maxillæ maris unco corneo instructæ; mentum transversum, margine antice integro, angulis anticis rotundatis, disco punctato; setis labii et maxillarum ultra marginem anticum porrectis. Antennæ breves, clava tripartita. Oculi cantho antice parum incisi, capite utrinque pone oculos angulato. Prothorax latus, transversus, convexus, capite latior, lateribus subserratis, antice rectis, postice obliquis, angulis lateralibus posticis acutis, margine antico in medio in tubercula duo confluentia elevato lineaque tenui media longitudinali impressa; disco glabro, tenue punctato, punctis minutis, et sensim versus marginem anticum evanescentibus. Elytra brevia, convexa, subovata, punctatissima, punctis oblongis sæpe confluentibus, nonnullis strias irregulares vix formantibus; lateribus luteo-griseo-setosis. Scutellum minutum, subtriangulare.

Pedes breves robusti; tibiæ anticæ extus 6-dentatæ, dente infero minimo, tibiæ 4 posticæ in medio denticulo unico armatæ. Corpus infra nigrum nitidum, pectore dense, abdomine vage punctatis.

Plate XII. fig. 2, *L. subtuberculatus* magnified; 2 *a*, labrum; 2 *b*, maxilla of male; 2 *c*, mentum.

A specimen of the male of this species, which, from its close similarity to *L. Cancroides*, appears to me to be certainly Australian, is also unique in the collection of M. Chevrolat. A rigid comparison with the typical specimen of *L. Cancroides* might possibly prove that this is but a variety of that insect with which it agrees in size. In M. Chevrolat's collection it bears a pink label.

Sp. 18. *Lissotes? crenatus.*

Niger subnitidus, capite lato, antice depresso, angulis anticis oblique truncatis, oculis cantho antice paullo incisis, mandibulis falcatis, apice truncatis et denticulatis; prothorace capite parum latiori punctatissimo, elytrisque ovalibus, convexis, punctatissimis, punctis lineas vix regulares sæpe formantibus.

Long. corp. cum mandibulis lin. 7.

Habitat in Nova Hollandia.

In Mus. Hope (Mus. Gory), sub nomine "*Dorcus crenatus*, Latr. MSS.? Voy. de Péron."

Niger, vix nitidus. Caput latum, tenuissime punctatum, punctis

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versus oculos majoribus; angulis anticis oblique truncatis, postice canthum (oculos antice parum incidentem) formantibus, vertice antice depresso, depressione utrinque tuberculo rotundato versus basin mandibularum terminata. Antennæ breves, clava triarticulata: mandibulæ capitis longitudine, valde curvatæ seu falcatæ, basi intus in dentem obtusum producta, apice truncato-trigono et denticulato. Labrum parvum, angulato-porrectum. Maxillæ maris elongatæ, mandone acuto, haud tamen in uncum corneum producto. Mentum magnum, fere semicirculare, antice vix integrum nec emarginatum. Labium laciniis duabus divaricatis setosis, vix ultra marginem anticum menti porrectis. Prothorax transversus, convexus, margine antico haud elevato, recto, lateribus paullo rotundatis setosis; disco linea tenui media seu canali parum impresso, minute punctatus: scutellum minutum, semicirculare. Elytra brevia, ovalia, convexa, punctis minutis et irregularibus, lineas rectas longitudinales numerosas vix regulariter formantibus. Pedes mediocres; tibiæ anticæ 7-dentatæ, dente secundo maximo, 4to et 7mo minutis, tibiæ 2 posticæ (intermediæ carentes) denticulo submedio armatæ.

Plate XII. fig. 3, *Lissotes? crenatus* magnified; 3 *a*, head seen from beneath, with the mentum removed; 3 *b*, maxilla; 3 *c*, mentum and labium seen from within.

This interesting Australian insect formed a portion of the collections made by Péron in the South Seas, and is now in the museum of Mr. Hope, obtained from that of the late M. Gory, and inscribed with the manuscript name which I have adopted, and which was, I believe, proposed for it by M. Latrielle. It agrees with *L. Menalcas* in the form of its very curved mandibles, but its maxillæ are not armed with a curved spine; the mando is straight and acute. How far this character will, however, interfere with the sectional arrangement of the family proposed by Dr. Burmeister remains to be determined.

Sp. 19. *Lissotes obtusatus.*

Dorcus obtusatus, Westwood, Ent. Mag. v. p. 267.
Ægus (B) *obtusatus*, Burmeister, Handb. v. p. 402.
Habitat Van Diemen's Land.

Obs.—Both sexes of this species have the mando of the maxillæ furnished with a corneous hook; the mandibles of the male are very similar to those of *L. Cancroides*.

Messrs. Burmeister and Reiche have suggested the identity of

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this species with *Dorcus curvicornis*, Latr. in Dej. Cat. from New Holland. The description of that species given by Boisduval, "Faune de l'Oceanie," 2, p. 235—"Fuscus thorace transverso subpunctato; elytris punctatis; mandibulis exertis, dente crasso armatis; subtus piceus," is too slight to determine the identity, or even to warrant the retention of Latrielle's name if proved. My insect is not fuscous, the prothorax is as strongly punctured as the head, and I can scarcely think that Latreille would have applied such a name as *curvicornis* to the species.

Sp. 20. *Lissotes reticulatus*.

Lucanus reticulatus, Westw. in Trans. Ent. Soc. iv. p. 275, pl. xx. fig. 4.
Ægus (B.) *Cicatricosus*, Burmeister, Handb. v. p. 403.
Dorcus squamidorsis, White, in Zool. of Erebus and Terror, p. 9, pl. ii. fig. 2.

Habitat New Zealand.

Obs.—This species, with *L. Cancroides* and *obtusatus*, placed by Dr. Burmeister as the second section of the genus *Ægus*, belong, in fact, to a different sub-family, having the mando of the maxillæ in both sexes armed with a corneous hook. The mandible and maxilla of this sex in *L. reticulatus* are represented in our Plate XII. figs. 9 *a* and 9 *b*. It differs from the three preceding species, not only in its geographical position, but also in the patches of pile on the upper surface of the body.

Sp. 21. *Dorcus? luteus*, West. (Plate XII. fig. 4.)

Obscure niger, dense punctatus, punctis luteo-squamosis, elytris impresso-striatis, interstitiis punctis minutis impressis; mandibulis brevibus, sub-trigonis, intus dente obtuso bifido instructis; oculis omnino septo bipartitis.

Long. corp. cum mandibulis lin. 9 ($\frac{3}{4}$ unc.).

Habitat in Nova Hollandia.

In Mus. Hope, olim Gory.

Caput mediocre, punctatum, fronte sub-convexo, utrinque tuberculo instructo; angulis lateralibus anticis capitis obliquis, postice in septum (oculos omnino dividentibus) productis, lateribus pone oculos haud angulatis; labrum transversum, brevissimum, antice emarginatum setosum: mandibulæ capite breviores subtrigonæ, apice intus curvato acuto; margine interno in medio dente bifido obtuso armato. Antennæ breves, articulo 7mo intus acute producto, clava 3-articulata: max-

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illæ dense setosæ, mandone inermi. Mentum transversum, punctis magnis impressum, angulis anticis rotundatis; antice emarginatum, laciniis labii et palpis labialibus (apice articuli ultimi excepto) occultis. Prothorax capite multo latior; lateribus rotundatis, angulis posticis acutis, disco convexo punctato lineaque media abbreviata impressus; scutellum breve semi-rotundatum. Elytra ovalia, prothoracis latitudine, convexa; singulo striis sex longitudinalibus impressis, interstitiis striarum punctis minutis (sæpius triplici serie dispositis) impressis; punctis omnibus pilis minutis luteis vestitis, inde insectum coloris lutei apparet. Pedes antici tibiis serrulatis dentibusque sex majoribus armatis; intermediis dente medio alteroque minuto subbasali; posticis dente medio unico. Corpus infra nigrum, magis nitidum, punctatum.

Plate XII. fig. 4, *Dorcus? luteus*, magn. auct.; fig. 4 *a*, labrum and mandibles; 4 *b*, extremity of antennæ; 4 *c*, eyes divided by the canthus; 4 *d*, maxilla; 4 *e*, mentum seen from within the mouth, showing the labial laciniæ and palpi.

This Australian species is also in the Hopean collection obtained from M. Gory. The eyes are entirely divided by the lateral septum, the maxillæ unarmed, the seventh joint of the antennæ pointed in the inside and setose. The specimen appears to me to be a male, notwithstanding the small size of the mandibles. Want of certainty, however, in this respect, as well as ignorance of the opposite sex, and uncertainty as to the structure of the mando of its maxilla, prevents my assigning the present species to its true genus. It is here, therefore, only placed provisionally in the genus *Dorcus*.

Sp. 22. *Figulus Lilliputanus*, Westw. (Plate XII. fig. 5.)

Piceo-castaneus, nitidus, capite supra irregulari, angulis lateralibus postice porrectis; mandibulis brevibus, intus dente obtuso armatis; prothorace subquadrato, lateribus dense punctatis discoque impressione abbreviata notato; elytris regulariter punctato-striatis.

Long. corp. fere lin. 4 (¼ unc.).

Habitat apud Adelaidam, Novæ Hollandiæ.

In Mus. Westwood.

Omnium *Lucanidarum* species minima, *Clivinam fossorem* simu-

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lans. Oblongus, subdepressus, nitidus, totus piceo-castaneus. Caput transversum, punctatum, supra irregulare, scil. tuberculis rotundatis tranversim positis inter marginem anticum et medium verticis; angulis lateralibus anticis obliquis, postice directis et septum planum, margine elevato, oculos dividentem, formantibus; capite pone oculos, in collum depressum, angustato. Labrum breve, transversum, porrectum. Mandibulæ capite breviores; apice subacutæ curvatæ; intus in mare dente crasso sub-obtuso armatæ; fœminæ paullo minores, apice denteque interno acutioribus.

Maxillæ in utroque sexu parvæ, mandone corneo uncinato; mentum subquadratum, antice paullo latius, angulis anticis rotundatis margine antico parum emarginato, labii laciniis palpisque labialibus fere omnino occultis. Prothorax fere quadratus, lateribus sub-rectis, angulis anticis rotundatis, dorso parum convexo, undique punctis minimis vage impresso, in medio sulco parum profundo grosse punctato impressus lateribusque punctatis. Elytra oblonga subconvexa, postice rotundata; prothoracis latitudine; regulariter 6-punctato-striata, interstitiis lævibus, nitidis, lateribusque punctatis. Pedes breves, tibiis anticis in mare dilatatis planis, extus subsinuatis (an semper?); in fœmina extus 6-dentatis, dente infero minimo, tibiæ 4-posticæ dente medio intermediisque denticulis duobus subbasalibus armatis.

Plate XII. fig. 5, *Figulus Lilliputanus*, magn. anct.; 5 *a*, maxillæ; 5 *b*, mentum.

Sp. 23. *Dorcus Pelorides*, Westw.

Latus, niger, nitidus, sub-convexus, lævis; mandibulis capite plus duplo brevioribus, capite utrinque tuberculo parvo elevato, lateribus capitis antice obliquis tuberculatis, pedibus brevibus gracilibus.

Long. corp. cum mandibulis unc. 1.

Habitat in Nova Hollandia, Moreton Bay.

In Mus. Britann.

Totus niger, nitidus, facie omnino *Peloris Blaptoidis;* sub lente punctis minutissimis impressus. Caput convexum, antice emarginatum et depressum, sub lente tenue punctatum, angulis anticis oblique truncatis; postice bituberculatis, tuberculo postico canthum (oculum omnino dividentem) formante, lateribus pone oculos etiam in angulum productis. Man-

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dibulæ perbreves, subtrigonæ, supra planæ marginatæ punctatæ, apice acutissimo, intus denticulis duobus parvis armatæ. Maxillæ minutæ, mandone inermi. Antennæ breves, clava triarticulata, articulo ultimo apice truncato. Prothorax transversus capite paullo latior, lateribus rotundatis, tenue marginatis et punctatis, intus in medio impressione parum profunda, punctoque utrinque approximato; disco lævi convexo. Elytra prothoracis latitudine convexa glabra, apicibus et lateribus tenuissime punctatissimis, disco lineis nonnullis longitudinalibus vix distinctis. Pedes breves, tibiæ anticæ extus 5-denticulatæ, dentibus duobus anticis majoribus. Tibiæ 4 posticæ graciles serrulatæ, pone medium dente minuto armatæ.

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XXI. *Observations on the Species of* Elateridæ *described by Mr. Curtis in the First Part of the Third Volume of the New Series of the Transactions of the Entomological Society of London. By* E. W. Janson, Esq.

[Read 5th March, 1855.]

1. *Ectinus aterrimus*, Linn. I perfectly agree with Mr. Curtis that this insect has, at present, no claim whatever to a place in our lists, into which it has been introduced both by Mr. Curtis and Mr. Stephens.

2. *Ectinus? gagates*, Curtis; *Elater aterrimus*, Curtis, *olim*, but not of Linné. This insect does not pertain to the genus *Ectinus*; the anterior margin of the head or clypeus projects over the upper lip, which takes a perpendicular direction, and is at nearly a right angle with the clypeus, and the covers of the posterior thighs are dilated internally and furnished with a large tooth; characters totally at variance with those upon which the illustrious and accurate Eschscholtz, (between whose distribution and that of Latreille, Mr. Curtis has drawn a comparison unfavourable to the former,) has founded the genus.

   Mr. Curtis's insect is *Ampedus lugens* of Redtenbacher, and of which the late learned Professor of Halle, Dr. Germar, has given an excellent description in his "Zeitschrift für die Entomologie," v. p. 177, No. 40, (1844). It is the *Ampedus anthracinus* of Dejean's Catalogue, under which name I have received it from Paris, where, I believe, it is not of uncommon occurrence. Two British specimens, now in my hands, appertain to the rich collection of our indefatigable treasurer, Mr. S. Stevens.

3. *N. G.? punctolineatus*, Zool. Journ. iv p. 524, *Ectinus aterrimus* of the Stephensian cabinet.

   It appears to me that Mr. Pelerin's name should have been added to the specific title adopted by Mr. Curtis for this insect, but which is a Fabrician species; the *Elater niger* of the "Systema Eleutheratorum," ii. p. 227 (1801), but probably not of Linné, recognizably figured by Panzer in the 101st

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fasciculus, plate 16, of his "Deutschlands Insecten," and described under the name of *Cratonychus niger* by the late Dr. Erichson in his usual masterly style, in his monograph of the genus in Germar's Zeitschrift, iii. p. 90, No. 1 (1841). I will add that it is congeneric with the *Melanotus fulvipes* of British cabinets, having the claws toothed internally after the fashion of a comb, a circumstance not noticed in Mr. Curtis's Memoir, although stated on the wrapper of the subsequently published part of the Transactions. This insect occurs abundantly throughout central and southern Europe. I have examples from Germany, France and the Ionian Islands; I likewise possess one of the original specimens, described by Mr. Pelerin in the Zoological Journal, captured by him near Twickenham, as mentioned by Mr. Curtis, and which has been kindly ceded to me by Mr. Thomas Desvignes, to whom I am likewise indebted for an opportunity of examining one of the examples captured by Mr. Marshall near Deal. To Mr. Pascoe I have also to tender my thanks for a remarkably fine male specimen taken by him last spring in the same locality, and to the liberality of Mr. S. Stevens I owe the possession of a specimen found by him at Southend. Mr. Westwood has three individuals, which, I believe, are females of the present species, but I will not positively affirm that they are so, not having had an opportunity of bestowing upon them sufficient examination; they were picked up by him dead on Barnes Common.

4. *Elater nigrinus*, Payk., Curtis. This is the insect described by Germar, Zeitschrift, v. p. 175, No. 35, as *Ampedus nigrinus*, and universally known on the continent under that name; a specimen received from Mr. Curtis agrees perfectly with foreign individuals in my collection sent me from France and Germany so named; it is readily recognized by the transverse wrinkles on the interstices of the elytra.

I may mention, that *Elater rufitarsis*, Desvignes, Entomologist, p. 326 (1842), captured by that gentleman in Windsor Forest, is synonymous with the species now under consideration, and which appears to have a wide range in Britain, individuals having been taken by Messrs. Weaver and Foxcroft, at Rannoch, Perthshire.

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5. *Aplotarsus maritimus*, Curtis.

If the insects placed in this genus by the late Mr. Stephens may be considered typical, (and, seeing that the genus was established by him for their reception, I hold such must be the case,) the present species is certainly not an *Aplotarsus*; I have not yet been able satisfactorily to identify it with any of the continental species of the genus *Cardiophorus*, with which I have had an opportunity of comparing it, but to which genus I think it is referrible, although departing somewhat from the type in the unusual length of the antennæ, but it appears to have the prosternum abbreviated and compressed at its apex, and the posterior thigh-covers are suddenly dilated within. I possess a single mutilated specimen, which I obtained from Mr. Curtis.

6. *Cardiophorus formosus*, Curtis. Mr. Curtis indicates its close relationship to *Cardiophorus sex-punctatus* of Illiger, and which is probably too intimate to admit of specific distinction, Illiger himself having given six varieties of that Protean species.

7. *Aplotarsus? cothurnatus*, Curtis. This insect does not belong to the genus *Aplotarsus* of Stephens; it is the *Ampedus subcarinatus* of Germar, Zeitschrift, v. p. 177, No. 39 (1844), where it is fully described: it is the *Ampedus tibialis* of Dejean's Catalogue, under which name I have received it from Paris. Specimens have been taken by Mr. G. Guyon, in Richmond Park; by Mr. S. Stevens at Tooting Common, and by myself at Wanstead.

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XXII. *Memorandum on the Wing-Rays of Insects.* By Edward Newman, Esq., F.L.S., &c.

[Read 4th June, 1855.]

Although I have no wish to advocate the physiological as of higher importance than other branches of our Science, yet I venture to express a hope that physiology will claim a share of our attention, and that in our great and praiseworthy desire to become acquainted with the diversified characters of organs, we shall not altogether lose sight of the fact, that organs are the mere instruments of functions, while functions are the mainsprings of vitality and the evidences of its existence. It has lately been my duty to deplore the loss of one of the greatest physiological Entomologists the world has ever produced; and although his mantle has not fallen on either of us, though we can no more hope for a succession of Newports than of Shaksperes or of Newtons, still I trust there will arise zealous followers of so eminent a philosopher, and that many of us will strive to be the *proximus*, undaunted by the *longo intervallo*, with which our biographers will assuredly accompany their comparison.

Influenced by these feelings I have arranged, but I fear not very methodically, some observations and ideas which I had long ago jotted down, touching the office of those familiar portions of an insect's wing commonly known as nervures or veins; and, even though I fail to make proselytes to my views, yet I think I may succeed in turning the attention of some of our members to a subject replete with interest, and one which must amply repay them for the time and attention required in its investigation.

In the wing of every insect are to be seen certain harder, more opaque, more incrassated portions than the rest, and these I will call rays: day by day we are learning to appreciate more highly the value of these rays as affording characters whereby to distinguish species, genera and even families from each other: there really seems no limit to the assistance they render us in arriving at just, sound and permanent conclusions; neither have we yet seen an end, or even the beginning of the end, of the profound and praiseworthy assiduity with which these same rays are studied: yet, I believe I am correct in saying that we make no attempt to ascertain their use, to learn the allotted part which they play in

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the economy of the animal, the definite function which these organs are specially created to perform. It must not be supposed that, in making this assertion, I either overlook or undervalue the researches of Latrielle, Herold, Oken, Chabrier, Jurine, Audouin, Robineau-Desvoidy and Macquart; but those entomologists, who are familiar with the works of these eminent authors, will recollect, that with the single, and, I may say, singular exception of Oken, there is scarcely an attempt made to work out conclusions, leaving these rather to be inferred from names than enforced by the synthesis of details. Leach, with that intuitive perception of truth which is the distinguishing characteristic of his multifarious labours, called them pterygostea or wing-bones; and the observations of Chabrier, Robineau-Desvoidy and Marquart most undesignedly corroborate the conclusion which these terms imply: each of these authors adduces satisfactory evidence that the rays perform the office of wing-bones, without announcing that conclusion; each seems to unveil truth without perceiving her. Others dwell, more or less emphatically, on some function going on within the ray; as if the ray had no other office than to perform that function—as if they believed that a man lived that he might breathe and feel, or that his blood might circulate, instead of adopting the more simple and obvious conclusion that it was ordained for these functions to be carried on in order that he might live.

One class of observers finds the wing-rays to be traversed by tracheæ, and hence concludes they are organs of respiration: another asserts they are permeated by nerves, and thinks this a warranty for giving them the name of nerves; while a third discovers in them channels through which blood circulates, and hence other writers have called them veins. Now, I raise no objection to receiving the evidence of these observers; on the contrary, I can bear willing testimony to the existence of channels for the passage of both air and blood; still I reject, because it were most illogical and unphilosophical to accept, either of the three hypotheses which Entomologists have founded on these observations, and which severally supposed the rays to be branchiæ, nerves and veins.

The breathing hypothesis, though, perhaps, not originated, was warmly advocated by Oken, who, having satisfied himself that the tracheæ really traversed the rays, and thus unquestionably established a connexion between the wing and the process of aëration, concluded that the wing was an external naked branchia to whose functions were superadded that of flight. We have been so ac-

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customed to smile at the transcendental hypothesis of Oken, to regard his great peculiarities, the substitution of hypotheses for truths, of verbs for nouns, that we agree in discarding this idea, which, however, divested of two errors, first, the mistaking of an analogy for an homology, and secondly, the mistaking of an active for an apathetic function, evidently indicates an acute perception of facts, which however admit of an explanation totally different.

The nerve hypothesis, although by far the most popular, has never been advocated with an earnestness displaying any strong belief in its truth: its great recommendation appears to be conveyed in a name, given almost at haphazard, yet, strange to say, universally received. Kirby and Spence recommend the substitution of the word "nervure" instead of nerve, and other authors have used the terms "nervelet," "nervule," "nervation" and "neuration"; yet I am unaware of a single attempt to show that these rays are in any respect organs of sensation; indeed, no Entomologist will maintain that they are so; and if the word nerve is objectionable because of its untruth, then are the endearing diminutives, or indeed any terms conveying the same untruthful idea, objectionable also; for it is impossible to disconnect such terms from the idea of a function of feeling.

The vein hypothesis is the last and most fashionable; it has well nigh driven the nerve hypothesis out of the field; and is adopted in this country by such eminent Entomologists as Haliday, Walker, Stainton and Westwood; the last-named of whom has said, in his introductory observations to Hewitson and Doubleday's Genera of Diurnal Lepidoptera, that, now these rays are proved by physiological investigation to be veins, they ought to be so called: but I hesitate to accept the premises, because I deny that a single observation has ever been made that can warrant such a conclusion.

There are two modes of deducing conclusions from phenomena which nature reveals to our senses, and thus makes manifest to our understandings: first, by tracing the source of acts; secondly, by learning the object of structure. I am not confident that either of these modes affords positive, but both of them afford presumptive, evidence in favour of my conclusion, which, in addition to the support thus derived from opposite sources, receives additional strength from the exactness with which acts and structure appear to harmonize. But it must be borne in mind that man cannot reason conclusively on the functions of a structure referrible to a type essentially differing from that on which his own body is

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formed: he may, indeed, accumulate evidence as to the nature of the function performed, until such accumulated evidence becomes highly satisfactory, but he cannot positively infer the function performed from the quality and characters of the organ performing it: witness the antennæ of an insect, the real use of which is still a moot question, suspended perhaps for the moment, but only on account of its difficulty.

Now taking a *primâ facie* view of the wing of a butterfly, denuded of its lepidia, it appears to consist, first, of a fabric of the most delicate filmy, powerless character; indeed, so excessively attenuated, that a small portion, detached from the rest, infallibly floats awhile on the air; and, secondly, of a strong and durable framework, on which the filmy fabric is extended and suspended, as paper on the frame of a kite or glass in a window or greenhouse. Seeing the wing, thus composed of two distinct elements, capable of sustaining powerful and continued motion, and having observed and considered these phenomena, I conclude that the framework is the support of the membrane, and at the same time is also the instrument by means of which its movements are accomplished; and I arrive at this conclusion, not speculatively or hypothetically, but involuntarily, and because the mind ignores every other. Determined, however, to take nothing for granted, in a conclusion so opposite to the received opinions and habitual usages of all my Entomological friends, I secured a number of specimens of *Pieris Brassicæ*, when strongest on the wing: I separated the leading wing-rays with the point of a penknife, in some near the basal, in others near the distal extremity of the ray: in every instance the distal portion of the wing fell powerless; the balance was destroyed, and the poor mutilated insects, in their futile attemps to fly, rolled over and over on the ground, until, out of compassion, I terminated their tumbling. Here then was evidence, *first*, that the filmy membrane was supported by the rays, and therefore that the rays were organs of support: and, *secondly*, that their mutilation prevented the insects from flying, and, therefore, that they were organs of support subserving the power of locomotion. Still I can imagine that some strenuous advocate of either of the received hypotheses may contend that the motive power resided in the membrane, but was deprived of its efficiency by the injury it had received on my separating the rays. This argument I am able to invalidate by one of those coincidences which often appear curious and unaccountable. It happens, that many years ago I made, and luckily published, an observation which bears, and I think conclusively, on the subject. I found, in Darenth

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Wood, a specimen of what I believe to be *Argynnis Paphia*, in which the membrane of the wing had been destroyed by some extraneous and unknown agency; the principal rays, however, remained entire: the insect was on the ground and attacked by a colony of ants, and the mutilation was so complete that I had the greatest difficulty in making out what the creature could be; yet, notwithstanding its injuries, it continued to move the denuded rays up and down with great vigour and rapidity; the erect and horizontal position alternating as when an insect flies, and the motion being, in all likelihood, a well-intentioned but abortive effort to escape by flight from its assailants. Here, then, is positive proof that the motion of the rays is not communicated by the membrane, and also strong presumptive proof that the converse of this is the actual truth: viz. that the rays, under the influence of the muscles and tendons, and these again under the influence of the will. communicate motion to the wing, thus entirely reversing that assumed sequence of facts, which would constitute the wing a competent organ of progressive motion, and its rays merely subservient to respiration, feeling or circulation.

I therefore consider the rays of an insect's wing as performing precisely the same functions as the bones of a bat's wing, and the wing of a butterfly as the exact analogue of the wing of a bat. And at this point I must beg leave to pause for a moment, in order to express my unqualified dissent from that superficial mode of investigation, which seeks and supposes that it perceives, in an exosteate, the homologues of organs familiar to us in an endosteate animal. The distinction between analogues and homologues is broad, well defined and perfectly intelligible: analogues are organs essentially different, performing the same functions; homologues are organs essentially the same, yet, under modified or altered forms, capable of performing widely different functions: thus the ribs of *Draco volans*, the fingers of a bat, and the rays of a butterfly, are only analogues, although the function they perform is absolutely identical; while the radius and ulna of man, the lion and the whale, are strictly homologues, although they perform three widely-different functions.

Proceeding to consider the evidence afforded by structure, it seems necessary to commence with the attachment of the rays to the trunk of the insect.

Libellula, a genus preeminently distinguished for its powers of flight, the swallow, or perhaps the vulture, of the insect world, has been selected by Chabrier for most of his explanatory dissections; and in this insect the thoracic cavity is almost filled by

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four enormous cylindrical muscles, each attached below to the interior face of the sternal osteodermal envelope, and continued above in a conical form until terminated in a tendon absolutely attached to a ray of the wing. Take the thoracic mass of a *Libellula* recently killed in one hand, and, with the other introduce a pin through the aperture caused by the separation of the abdomen, and it will be seen that motion can be readily communicated to the wings, by forcibly moving the muscles I have described: these muscles are continuous with the tendons, the tendons with the rays, and the rays support the membrane. Fragments of these muscles and tendons appear conspicuously in Bowerbank's figure of the wing of *Chrysopa Perla*, and their existence may be ascertained in a moment, by pulling out of its socket the wing of any cabinet specimen of a large moth or beetle; the adhesion to the rays being stronger than the adhesion of the component parts of the muscle *inter se*, they cohere to the wing more readily than to the muscular mass; indeed it cannot escape the notice of those who examine the internal cavity of a *dried* insect, that the muscle readily separates into flakes, which have little or no cohesion among themselves.

The shaft of the ray, or, we may say, the ray itself, exhibits an exquisite, perhaps an unparalleled, example of the union of lightness with strength, combined with another important element of usefulness, that of partial flexibility. It is long, strong, cylindrical, often transparent, and generally tubular, the last-named condition being, in the estimation of engineers, a most important element of enduring strength. But these characters do not always obtain, some of the rays in the wings of *Coleoptera* being merely suspended in membrane, as the limbs of a *Manatus* in muscle; and in such instances they are neither transparent nor cylindrical. Again, in a great number of instances, in the genera both of *Coleoptera* and *Hymenoptera*, the rays are articulated, not only once, but divided into a considerable number of short pieces or joints: Jurine, who first noticed this structure, did not, as it seems to me, either understand or justly appreciate it; he called the joints *bullæ*, and he treats them simply as bubbles. It would, however, be somewhat needlessly extending the inquiry, were I to discuss the various phases which these rays may exhibit; suffice it to say, that no phase, however abnormal, throws any doubt on my suggestion of their being exclusively organs of support in exactly the same sense as the bones of vertebrates are so considered. Taking the rays of a butterfly's wing as a normal and familiar example, and an apt illustration of wing-rays in general, and

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seeing how strong and tough these are in life, and how frail and fragile after death, it becomes a source of much interest to know that they possess what might be called a special vitality, the continuance and co-existence of which with the insect's life is provided for by an organization of the most elaborate and beautiful character, an organization unsurpassed in nature for its minute and wonderful perfection: unlike the delicate membrane they support, the rays are traversed, vivified and invigorated by the permeation of air and blood throughout their central channels. Mr. Bowerbank, in an admirable memoir published in the third volume of the Entomological Magazine, corroborating Oken's subsequent observation, but leaving his hypothesis untouched, has shown us that large annulated tracheæ traverse the entire length of the cavity of the wing-rays, in *Hemerobius Perla*, often occupying three-fourths, and sometimes four-fifths, of the central channel; and he watched the blood flowing around these air-tubes, between their external surface and the interior wall of the ray itself. Now, since neither the air nor blood, which thus in company traverse the rays, escapes into the membrane of the wing or elsewhere, but is strictly confined in its course to the interior of the rays, it seems reasonable to conclude that its office, in connexion with the rays, is only that of maintaining them in a state of perfect health and vigour, in a word, of preserving them in the exact state best adapted to the due performance of the functions assigned to them. It would not, I believe, be difficult to show that the wing-bones of birds and bats are permeated by air and blood in a similar manner, and probably for a similar purpose, and that they undergo a continual process of renovation through the instrumentality of at least one of these elements. It is, therefore, as strictly in accordance with inductive philosophy as with the immediate and direct suggestions of the mind, whether instructed or uninstructed, to regard the wing-rays of insects wholly and entirely as organs of support, in some cases actively employed in, always more or less connected with, the function of locomotion, and their vascular *appareil* as simply subservient to the maintenance of their healthful vitality and efficiency.

There is something in a name, whatever the poet may teach to the contrary, and if we discard such names as branchiæ, nerves and veins, because untruthful, *still* the name of *pterygostea* remains and implies the truth. I think, however, that the simple word *ray*, Latinized by *radius*, will be found sufficiently descriptive, and fortunately possesses another claim, that of priority.

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XXIII. *On the Freshwater* Entomostraca *of South America.* *By* John Lubbock, Esq., F.Z.S.

[Read May 7th, 1855.]

Professor Dana, in his great work on the *Crustacea* collected by him in Captain Wilkes's expedition, has devoted a long and most interesting chapter to the geographical distribution of these animals. Great, however, as have been the pains he has bestowed on it, and many as have been the facts at his disposal, yet there are so many species yet to be described, and the geographical limits of those which are described are so little known, that it must be confessed that he excites rather than satisfies the interest of Naturalists. Also, as might have been expected, attention has been more directed to the higher and larger families than to the smaller and lower ones, which are both more rich in species, and have hitherto been less studied.

The freshwater provinces have necessarily more definite boundaries than the marine, because it is more difficult for fresh water species to migrate, or be accidentally carried away from their native haunts. For these reasons I was anxious to examine the *Crustacea* collected by Mr. Darwin in the rivers and lakes of South America. It can hardly be doubted that, when thoroughly examined, they will prove as rich in *Entomostraca* as our own; but owing to the meshes of Mr. Darwin's nets being too large, and to his attention not being especially directed to *Entomostraca*, I only find five species in his Collection, and one of them is so much injured that I cannot describe it. Professor Dana, in his great works, describes three species; Mr. Gay, in the *Fauna Chilena*, six; and Dr. Baird, in the Proceedings of the Zool. Soc., one; so that the list is at present as follows:—

Cypris Donnettii, Baird.
Chilensis, Dana.
speciosa, Dana.
Australis, mihi.
Brasiliensis, mihi.

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Candona albida, Dana.
Lynceus nasutus, Gay.
albicans, Gay.
armatus, Gay.
Diaptomus Brasiliensis, mihi.
Cyclops brevicornis, Gay.
Daphnia spinifera, Gay.
granaria, Gay.
Brasiliensis, mihi.

Fourteen species, all belonging to genera also found in Europe, and affording several remarkable instances of representative species. *Daphnia spinifera* closely resembles *D. mucronata*. *Diaptomus Brasiliensis* in many points agrees perfectly with *D. Castor*. *Candona albida*, and all the *Cyprides*, are very like the English species, and if the *Lyncei* were described more in detail the same would probably be found to be the case with them also.

Mr. King has lately described some of the Australian fresh water *Entomostraca* in the Pro. Roy. Soc. Van Diemen's Land, January, 1853. He mentions four species of *Alona*, two of *Eurycercus*, two of *Chydorus*, two of *Dunhevedra*, n. g., one *Macrothrix*, two *Moinæ*, and four *Daphniæ*, one of which he considers identical with *D. mucronata*, Müller. These again are all European genera except one, *Dunhevedra*, which however does not differ materially from European forms.

This result is interesting, and I believe in accordance with what has been observed in other families. It is curious that fresh water genera have usually more extended geographical limits than those which inhabit either the land or the sea.

Genus Cypris.

Sp. 1. *Cypris Donnettii*, Baird, Proc. Zool. Society.

"Carapace valves elongate oval. Anterior extremity narrower than posterior, and considerably flatter; posterior extremity rounded, and very convex; dorsal edge arched; ventral slightly reniform. The surface of the valves is smooth and shining, of a brown colour, variegated with patches of a darker shade. The pediform antennæ are provided with about six bristles of considerable length."

Fresh water ponds, Coquimbo.

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Sp. 2. *C. speciosa*, Dana, Wilkes, Exp. 1852, v. 13, 1285.

"Oblonga, subovata, antice angustior, subtus fere recta, vix excavata, alioque bene arcuata, latior et plus duplo longior quam alta; ad marginem anticum pubescens, posticum breviter ciliata. Flava et læte viridis, areis flavis paucis imperfectis viridi circumdatis."

Rio Janeiro.

This species appears to differ from the last chiefly in the presence of hairs.

Sp. 3. *C. Chilensis*, Dana.

"Latere visa, subovata, pone medium parce altior, subtus paululo arcuata, dorso vix gibbosa, triplo longior quam lata, duplo longior quam alta, marginibus antico infero posticoque pubescentibus. Antennæ anticæ, 7-articulatæ, setis dimidio corporis vix longioribus."

Valparaiso.

Length $\frac{1}{16}$ nch.

Sp. 4. *C. Australis*, mihi.

"Latere visa, subovata, antice paulo angustior, setis passim sparsis, marginibus postico, inferoque fere rectis, antico superoque bene arcuatis."

Maldonado.

Collected by Mr. Darwin in June, 1833.

Length $\frac{1}{16}$ inch.

Closely resembles *C. Donnettii*, but differs in having scattered hairs, and the hind margin is straight.

Sp. 5. *C. Brasiliensis*, mihi.

"Marginibus supero inferoque fere rectis, aliis bene arcuatis, extremitatibus fere æquis. Setis passim sparsis."

Maldonado.

Collected by Mr. Darwin in May, 1833.

Length $\frac{1}{11}$ inch.

This species closely resembles some of the *Candonas*, but it has the antennary setæ long, and belongs therefore to *Cypris*.

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Genus Candona.

Sp. 6. *C. albida*, Dana.

"Latere visa, breviter subelliptica, extremitatibus fere æqua, late rotundata, subtus recta, supra obsolete gibbosa; triplo longior quam lata, non duplo longior quam alta, margine pubescente. Oculus margine superno remotus. Albido-margaritacea, postice et superne paulo brunnea."

Valparaiso.

Length $\frac{1}{24}$ inch.

Genus Lynceus.

Sp. 7. *L. nasutus*, Gay.

"Alboflaviscens, capite elongato inflexo rostriformi; testa postice truncata, angulo externo spiniformi."

"A very small species, with the head prolonged into a large curved rostrum as in some *Circulionidæ;* a small oculiform spot in front of the eye; carapace truncated behind, and its latero-posterior extremities angular, with a strong spine."

Colour a pale yellowish, uniform white.

San Carlos de Chiloe among *confervæ*.

Sp. 8. *L. albicans*, Gay.

"Valvis postice rotundatis, inermis."

"Natatory antennæ with long hairs, the oculiform spots distinct; head prolonged into a beak, more thick but less large than that of the preceding species; inferior and posterior margins of the valves rounded, without angles or spines."

Colour a transparent white.

Sante Rosa.

Described as existing in "Los mares de Sante Rosa."

This species probably belongs to Dr. Baird's genus *Chydorus*.

Sp. 9. *L. armatus*, Gay.

"Albovirescens; valvis postice spiniferis."

"The hairs of the antennæ and feet are large and short, valves rounded inferiorly and terminated posteriorly by a dentated tail."

Colour a very pale greenish white.

With the preceding

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Genus Daphnia.

Sp. 10. *D. spinifera*, Gay, Fauna Chilena.

" Alba, valva spinis minutissimis hirsuta."

" Head separated from the back by a slight depression, and prolonged in the form of a rounded beak, valves terminated posteriorly by large, sharp points, a little curved at the apex. The whole surface of the shell covered with little spines, only visible with a microscope."

San Carlos de Chiloe.

This species resembles in shape *D. mucronata*.

Sp. 11. *D. granaria*, Gay, Fauna Chilena.

" Alba, valva subtilissime granaria."

" Head not separated from the back by a depression; valves shagreened on the whole surface like the elytra of the *Elafri;* feet of the last pair terminated by one stylet; external antennæ very large."

Colour white and transparent.

San Carlos de Chiloe.

Length .

Width $\frac{1}{8}$ line.

Sp. 12. *D. Brasiliensis*, mihi.

D. Pulici similis. Valvis lævibus margine supero regulariter arcuato et pone medium spinifero, postico acuto, infero fere semicirculari.

Collected by Mr. Darwin in June, 1833.

Length $\frac{1}{14}$ inch.

This species has a slight depression between the head and the body, and a few hairs on the lower posterior margin, as well as above.

There were three specimens of another species in Mr. Darwin's Collection, but they were so much injured that I did not like to found a new species on them.

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Genus Cyclops.

Sp. 13. *C. brevicornis*, Gay.

"Albescens, antennis primi paris thorace brevioribus."

Antennæ of the first pair much shorter than the thorax; the terminal setæ of the lobes of the abdomen as large as the body; eggs in one group on the upper side of the abdomen. Colour rosy white, with patches of yellow on the back; feet white, eggs sea-green.

Length

San Carlos de Chiloe.

I have some doubts whether this is a fresh water species; it is not *C. brevicornis*, Müller.

Family Calanidæ.

Sp. 14. *Diaptomus Brasiliensis*, n. s.

Cephalothorax 6-articulatus. Antennæ anticæ corpore paulo breviores. Antennæ secundæ, mandibulæ, secundi et tertii maxillipedum pares, et quarti primi pedum pares, ut in *D. Castore*. Pedes postici maris prehensiles. Abdomen maris 5-fæminæ 3-articulatum.

Long. $\frac{1}{18}$ unc.

Collected by Mr. Darwin, at Port Desire, in Patagonia. It inhabits fresh water.

The anterior antennæ consist, as usual, of about twenty-four segments; the right antenna of the male is prehensile, and the hinge joint is situated between the fifth and sixth segments, counting from the apex. The sixth, seventh, eighth, ninth, tenth segments, are slightly swollen, and contain the strong muscle which closes the hinge joint. I believe that it is opened again by its own elasticity, as I could not see any muscle for that purpose. The fifth, sixth and seventh segments bear each a large spine, which is pressed close to the antenna itself. The arrangement of the hairs is very similar to that which I have described in the Ann. and Mag. of Nat. Hist. for September, 1853, as occurring

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in certain other *Calanidæ*. The hairs are chiefly simple or lanceolate.

The total length of the organ is $\frac{1}{28}$ of an inch.

The second pair of antennæ are very like those of *D. Castor*. The hairs do not appear to me to be plumose; they are much longer than represented in Dr. Baird's Plate XXVI. fig. 1 *a*, being as long as the organ itself. The second segment bears a row of small bristles, which occurs in all the allied species which I have examined. The palpus is 7-jointed, and the second segment, counting from the base, appears to consist of three, which have partially coalesced. Each segment bears a long simple hair, and the apical segment has three.

The mandibles are very like those of the European species, and both have eight teeth, but in the present the interior, as well as the exterior tooth, is larger than the others. The palpus is much thicker, and the hairs longer, in proportion, than in Dr. Baird's figure.

The second pair of maxillæ are very like those of *D. Castor*. They are indistinctly 3-jointed, and bear about twenty hairs.

Length $\frac{1}{160}$.

The third pair of maxillipeds are 7-jointed; the two basal segments are the largest, and bear respectively two or three small hairs. The terminal portion is smaller than in *D. Castor*, especially the last two segments, which have almost coalesced.

Length $\frac{1}{80}$.

The thoracic legs are very similar to those of *D. Castor*. The two branches are both 3-jointed. The hairs are arranged as follows. Beginning with the external and larger branch (fig. 5), the two basal segments have each two hairs at the apex, one at each side. The apical segment has eight; the three which are situated on the outside are short, stout and spine-like, while those on the inner side are long, slender and plumose. They evidently assist in swimming.

The smaller branch has one hair at the apex of the basal joint, two on the second and six on the apical joint, all on the inner side, and similar to those of the other branch. The large basal segment has, as usual, a plumose hair on the inner side, and the second, from which the two branches spring, has two hairs, one of which is lanceolate.

The basal segment appears to contain three muscles, two flexors and an extensor. The first flexor appears to move the plumose hair, and I am not sure that the other two are not con-

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tinued into the next segment, which also has three muscles, firstly, a flexor which, rising at the base of this segment, is inserted into the inner side of the apex of the penultimate segment of the inner branch. The other two are the flexor and extensor of the larger branch, and are inserted into its base. This larger branch also contains a muscle similar to that of the smaller one. The specimens, however, have been so long preserved in spirits that it is difficult to make the muscles out with certainty, and in some specimens the arrangement appeared to be different.

The fifth pair of legs in the female are $\frac{1}{66}$ inch in length, and similar to one another. They are formed on the same plan as the other legs, from which they differ in several particulars, but chiefly in the shortness of hairs. The basal portion, as usual, consists of two segments, the second of which is slightly bifid at the apex, and bears a small hair. The larger branch is composed of three segments, of which the basal bears a large spine at the outside of the apex; the second, a large spine on each side of the apex, the inner one of which is provided with a row of little spines on its upper edge, and the apical three spines; the lesser branch, which is also 3-jointed, has the two basal segments each provided with a spine on the inner side of the apex, and the terminal segment armed with six spines.

Those of the male are larger, about $\frac{1}{40}$ inch in length, and nonsymmetrical. The right is rather the largest. The basal portion, as usual, consists of two segments, and bears two branches, the inner one small and 3-jointed, the apical segment armed with four spines. The outer large branch also consists of three segments, the two basal ones each bearing a spine at the apex externally. The second segment of this branch is crossed by a line, which appears to indicate that it consists nominally of two segments, especially as I have observed the same appearance in other species. The terminal joint has the form of a very large spine, and tapers very much to the end, which seems drawn out into a filament, and turned back. The apical half is dotted with a row of very fine teeth.

The left leg is rather smaller; the inner branch and the spine on the basal segment of the outer branch are wanting. The terminal segment is similar in form to that of the other legs, from which, however, it differs in having a spine externally at about a quarter of its length from the base, in not tapering quite so much, and in wanting the row of teeth or bristles.

The abdomen of the female consists of three segments, the first

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rather larger than the other two put together. The males have five segments. In both sexes the abdomen is terminated by two short lamellæ, each bearing five long plumose hairs.

EXPLANATION OF PLATE XV.

Fig. 1. *Cypris Brasiliensis*, mihi, outline.
2. *Cypris Australis*, mihi, outline.
3. *Diaptomus Brasiliensis*, mihi; second pair of antennæ.
4. *Diaptomus Brasiliensis*, third pair of maxillipeds.
5. *Diaptomus Brasiliensis*, first pair of natatory legs, male.
6. *Diaptomus Brasiliensis*, left leg of the fifth pair natatory legs, male.
7. *Diaptomus Brasiliensis*, right leg of the fifth pair natatory legs, male.
8. *Diaptomus Brasiliensis*, fifth pair natatory legs, female.
9. *Daphnia Brasiliensis*, mihi, outline.

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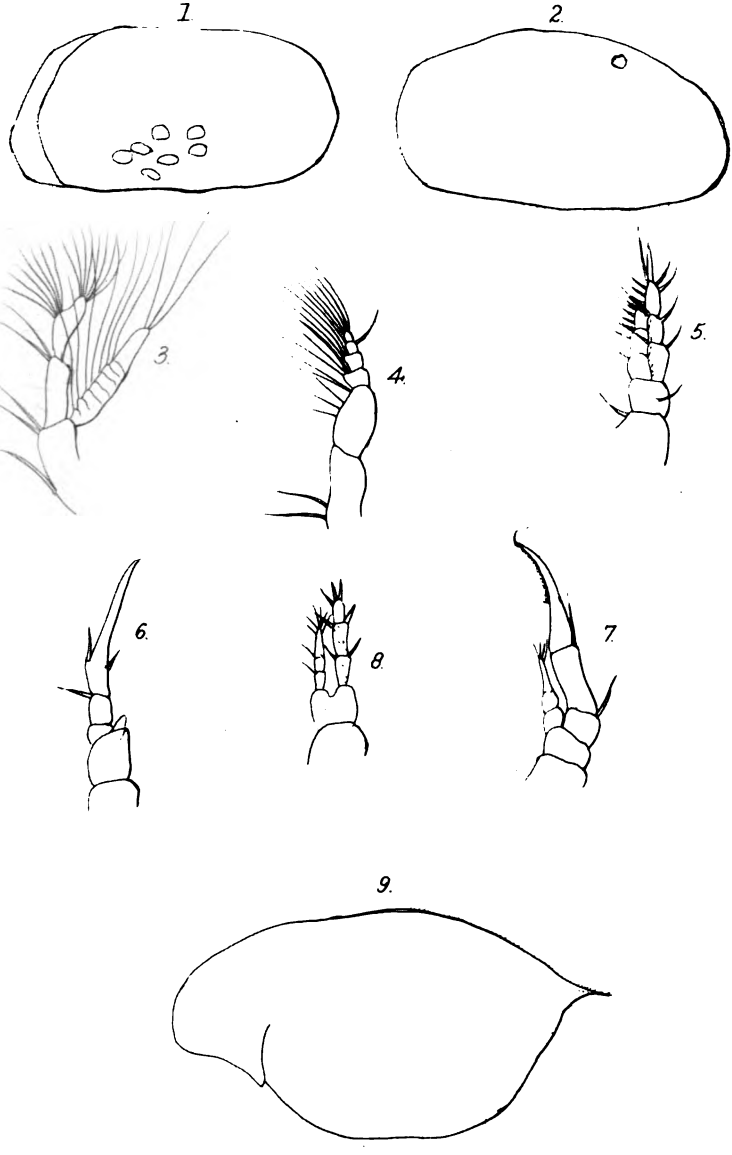

J. Lubbock Del.t & Sculp.t 1855.

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XXIV. *Monograph of the Australian Species of* Chrysomela, Phyllocharis *and allied Genera.* *By* J. S. Baly, Esq. (*Continued from page* 186.)

Genus 6. Australica (Details, Plate XIV. fig. 5 *a*, *b*, *c*.)

Chevr., Dej. Cat., edit. 3, 426; Orb. Dict. d'Histoir. Nat., ii. 358.

Calomela, Hope, Coleop. Man., iii. 166.

Antennæ subclavatæ vel subincrassatæ, articulo primo clavato, secundo brevi, ovato, tertio elongato, duobus proximis filiformibus, cæteris ad apicem graduatim dilatatis, compressis. *Palpi* clavati, articulo ultimo dilatato, truncato. *Unguiculi* dentati. *Corpus* ovatum vel elongatum, convexum; thorax transversus, lateribus non incrassatus; prosternum sæpe carinatum, basi bilobatum (*Platymelâ* exceptâ): pedes *maris*, articulo basali tarsorum quatuor anticorum plus minusve dilatato, pulvillo integro; *fœminæ*, pulvillo in medio longitudinaliter diviso.

Many of these insects are brilliantly metallic: the type is *Chrysomela Curtisii* of Kirby, described in the 12th volume of the Linnæan Transactions; the genus separates naturally into four subgenera.

Subgenus 1. Platymela.

Antennæ dimidio corporis breviores, subclavatæ, articulis 2—4 gracilibus, cæteris ad apicem valde compressis. *Prosternum* carinatum, antice productum, basi truncatum. *Corpus* elongatum, subconvexum.

These insects are at once separated from the rest by the truncate base of their prosternum.

Sp. 1. *Platymela sticticollis*, n. sp.

Elongata, pallide fulva, nitidissima, capite maculis duabus, thorace maculis sex nigris, elytris fusco-æneis, punctato-striatis.

Long. 3½ lin.

Elongate, shining, pale fulvous, with a metallic reflection. Head prominent, distinctly punctured, two large spots on the

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vertex brassy black; apex of jaws and the antennæ black, the latter slender, nearly half the length of the body, their four basal joints fulvous. Thorax twice as broad as long, sides nearly parallel behind, rounded and narrowed in front, anterior angles acute; above slightly flattened, smooth and shining, disc distantly, sides more closely punctured; on the surface are six black spots, four just behind the anterior margin and two on the disc. Scutellum triangular, fulvous. Elytra nearly parallel, scarcely wider than the thorax, more than three times its length, their apex acutely rounded, surface coppery, with a brassy tinge, punctate-striate; on each elytron below the shoulder is a large transverse impression. Beneath pale fulvous, the tibiæ and tarsi pitchy.

Melbourne.

I only know two specimens of this insect; one in the British Museum, the other in my own Collection.

Sp. 2. *Platymela unilineata*, n. sp.

Elongata, subconvexa, fusco-ænea, maculâ verticali, thoracis lineâ dorsali scutelloque fulvis.

Long. 4 lin.

Var. A. Tote fusco-ænea.

Elongate, subconvex, shining brassy brown, a vertical patch on the head, a dorsal vitta on the thorax, and the scutellum deep fulvous. Head shining, brassy green, finely punctured, on the face are a few coarser impressions; labrum, three first joints of antennæ, a small spot on either side at their base, and a short perpendicular line on the vertex, fulvous. Thorax twice as broad as long, narrowed from the base towards the apex, rounded near the latter, anterior angles acute, front margin concave, slightly produced in the middle; surface coarsely but sparingly punctured, the sides subvariolose; in the centre is an obscure fulvous line, which unites with the vertical spot on the head, and with the pale scutellum to form a longitudinal vitta. Scutellum smooth, rounded, fulvous. Elytra scarcely wider than the thorax, parallel, their sides subsinuate; surface smooth and shining, indistinctly flattened above, regularly punctate-striate, the interstices minutely and obscurely punctured; on either side, below the shoulders, is a broad, shallow fossa. Beneath brassy brown, the sternum fulvous.

Var. A. Entirely brassy brown.

Moreton Bay.

The type in the Collection of M. Chevrolat and in my own; the variety in my own possession.

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Subgenus 2. AUSTRALICA.

Antennæ dimidio corporis breviores, subincrassatæ vel subclavatæ, articulis 3tio ad 5tum filiformibus, tertio elongato, cæteris ad apicem graduatim incrassatis, compressis. *Prosternum* non vel vix elevatum, basi bilobatum. *Corpus* ovatum vel elongatum, *maris* tarsorum articulo basali vix dilatato.

The present subgenus contains by far the largest number of species; in many the longitudinal ridge on the prosternum is entirely absent; whenever present, its apex is gradually lost in the surface of the antipectus, and never abruptly truncate, or produced into a tooth.

I. *Disc of the elytra irregularly punctate, or with more than ten rows of striæ on each.*

Sp. 1. *Australica Curtisii*, (Kirby.)

Oblongo-elongata, sanguinea, profunde punctata, thoracis vittâ dorsali punctoque utrinque viridi-aureis, elytris cyaneis vel viridi-aureis, limbo omni sanguineo, punctato-striato, subtus nigro-cyanea, pedibus sanguineis, genubus tarsisque nigris.

Long. 3—3½ lin.

Chrysomela Curtisii, Kirby, Lin. Trans., xii. 473, n. 36, pl. 23, fig. 12.

Var. A. Pallidior, elytrorum disco profunde punctato-subrugoso, subtus nigro-cyanea, pedibus fulvis, femoribus puncto apicali nigro.

Chrysomela Curtisii, Boisd. Voy. de l'Astrol., 577.
Chrysomela punctipes, Germ. Lin. Ent., iii. 236.

Var. B. Infra pallida, nigro-ænea infuscata.

Var. C. Elytrorum limbo obscure nigro-æneo.

Var. D. Supra tote viridi-ænea.

Oblong-elongate, sanguineous, deeply punctured. Head shining, coarsely punctured, deeply impressed between the eyes; antennæ black, three or four basal joints fulvous beneath. Thorax twice as broad as long, its sides parallel behind, rounded and narrowed at the apex, the anterior angles acute, front margin concave; surface coarsely punctured, sides subvariolose, a broad dorsal vitta, dilated in the middle, and a small spot on either side in front, blue or brassy green. Scutellum smooth, impunctate. Elytra nearly four times the length of the thorax, rather wider at their base; sides parallel, apex rounded; above convex, the disc

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coarsely and irregularly punctured, metallic blue or green, limb entirely fulvous, punctate-striate. Beneath dark metallic blue or green, antipectus and legs sanguineous, the knees and tarsi black; prosternum deeply grooved, coarsely punctured.

Var. A. Paler, disc of the elytra more coarsely punctured, sub-rugose; legs fulvous, thighs with an apical black spot.

Var. B. Beneath pale, more or less stained with brassy black.

Var. C. Limb of the elytra obscure brassy black; legs as in the type.

Var. D. Above entirely metallic green.

South Australia; Tasmania. Var. A. Adelaide. Var. C. Melbourne, Mr. Barton.

In most Collections. Var. C. in the British Museum and my own Collection. Var. D. in that of Mr. Westwood.

Sp. 2. *Australica Mac Leayi*, (Boisd.)

Oblongo-elongata, fulva, profunde punctata, antennis, tarsis scutelloque nigris, elytris viridi-aureis, irregulariter punctatis, limbo omni fulvo, punctato-striato.

Long. 2⅛ lin.

Chrysomela Mac Leayi, Boisd. Voy. de l'Astrolabe, 577.

Chrysomela colorata, Germ. Lin. Ent., iii. 237.

Nearly allied to *Curtisii*, but smaller and entirely fulvous beneath. Oblong-elongate, deeply punctured, elytra brassy green, limb entirely fulvous. Head rugose-punctate, deeply impressed in front; on the vertex is a short black line, four basal joints of antennæ pale, the rest black. Thorax twice as broad as long, sides nearly straight behind, rounded and narrowed in front, anterior margin concave; disc coarsely punctate, sides variolose. Scutellum smooth, black. Elytra scarcely broader than the thorax, three times its length, parallel in front, their apex rounded; surface slightly excavated behind the shoulders, disc brassy green, irregularly punctured, limb entirely fulvous, punctate-striate. Beneath fulvous, apex of tibiæ and the tarsi black; prosternum plain, or but slightly grooved.

South Australia, common.

This insect is separated from *A. Curtisii* by its smaller size, immaculate thorax, and the pale under surface, without metallic tinge; it is however very difficult to distinguish from pale varieties of that species.

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Sp. 3. *Australica Bartoni*, n. sp.

Oblongo-elongata, profunde punctata, pallide fulva, vertice viridi-æneo, thoracis lineâ dorsali, genubus tarsisque nigris, elytrorum disco irregulariter punctato, viridi-æneo, limbo omni fulvo, punctato-striato.

Long. 4 lin.

Oblong-elongate, deeply punctured, pale fulvous, vertex and disc of elytra brassy green, a dorsal line on the thorax, the knees and tarsi black. Head coarsely punctured, deeply impressed between the eyes; antennæ black, the three basal joints pitchy. Thorax more than twice as broad as long, parallel, rounded and narrowed towards the apex, front margin slightly concave; disc coarsely punctured, the sides variolose; in the middle of the thorax is a black longitudinal line, its posterior third broadly dilated. Scutellum smooth, brassy green. Elytra parallel, scarcely wider than the thorax, three times its length, the disc brassy green, coarsely and irregularly punctured, limb pale fulvous, punctate-striate. Beneath pale fulvous, sides of the pleura pitchy; knees and tarsi black.

Melbourne, Mr. Barton.

In the Collections of the British Museum, Mr. Janson and my own.

Closely allied to *A. Curtisii*, differing chiefly in its larger size, pale underside and the shape of the dorsal line on the thorax; this in the former insect is dilated in its middle, but in the present one the enlargement occurs much nearer the base.

Sp. 4. *Australica cingulata*, n. sp.

Oblongo-elongata, convexa, nitida rubra; elytris cyaneis, rubro marginatis.

Long. 4½ lin.

Oblong-elongate, convex, shining red. Elytra deep metallic blue, their outer border red. Head coarsely punctured between the eyes; antennæ rather longer than the thorax, black, the three basal joints pitchy red. Thorax twice as broad as long; sides parallel and subsinuate behind, rounded and narrowed in front, anterior margin concave; surface coarsely, disc distantly punctured. Scutellum smooth, triangular, metallic red. Elytra rather broader than the thorax, more than three times its length, sides parallel in front, gradually rounded to the apex behind; surface convex, slightly sinuate below the shoulders, punctate-striate;

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the puncturing irregular on the sides. Beneath shining red, three basal joints of tarsi pitchy, claws red.

Northwest coast of Australia.

Two specimens of this fine insect are in the British Museum.

Sp. 5. *Australica maculicollis*, (Boisd.)

Oblongo-elongata, chalybeata, punctatissima, thorace rubro, punctis tribus nigris; elytris nigro- vel viridi-cyaneis, abdominis apice femoribusque rubris.

Long. 3 lin.

Chrysomela maculicollis, Boisd. Voy. de l'Astrolabe, 578.

Oblong-elongate, closely punctured. Head and thorax sanguineous; a vertical patch on the former and three spots on the latter, black. Head deeply impressed in front, smooth and finely punctured; antennæ robust, black, the two basal joints pitchy-red, palpi black. Thorax twice as broad as long, sides rounded in front, narrowed from their base to the apex, anterior margin slightly excavated, its middle feebly produced; sides closely punctured, disc nearly impunctate; on the centre is placed a large, round black spot, and on either side, near the outer margin, is a smaller one, the same colour. Scutellum smooth, rounded behind. Elytra scarcely broader than the thorax, three times its length, the sides subovate, gradually rounding from their middle to the apex; surface shining, dark metallic blue or green, closely punctured, the punctures on the disc irregularly placed in striæ. Beneath, with the thorax, the apical segments of abdomen, and the femora, sanguineous; tibiæ and tarsi black.

Melbourne, Mr. Barton; Tasmania.

Common in Collections.

Sp. 6. *Australica ioptera*, n. sp.

Oblongo-elongata, fulva, fortiter punctata, elytrorum punctis violaceis.

Long. 4—4½ lin.

Oblong-elongate, fulvous, coarsely punctured, the elytra covered with deeply impressed iridescent violet punctures. Head closely punctured; jaws and four apical joints of antennæ black. Thorax twice as broad as long, its sides parallel behind, narrowed and rounded in front, the anterior margin concave; surface coarsely and irregularly punctured. Scutellum smooth, impunctate. Elytra parallel, scarcely broader than the thorax, nearly four

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times its length; covered with deeply impressed, iridescent violet punctures, arranged in striæ near the suture, irregular over the rest of the surface.

Adelaide, Mr. Wilson; Melbourne, Mr. Barton.

In most Collections.

Sp. 7. *Australica fulvilabris*, (Germ.)

Oblongo-elongata, viridi-ænea, labro, antennarum basi pedibusque fulvis, thorace lateribus varioloso-punctato, elytris striatis, striis confuse punctatis.

Long. 2½ lin.

Chrysomela fulvilabris, Germ. Lin. Ent., 3, 238.

Oblong-elongate, convex, shining metallic green, the palpi, labrum, five basal joints of antennæ and legs fulvous. Head punctured; antennæ rather longer than the thorax, six terminal joints black. Thorax twice as broad as long, its sides rounded and narrowed in front, anterior margin concave; disc firmly and remotely, sides variolose-punctate. Scutellum triangular, smooth. Elytra a little broader than the thorax, three times its length, substriate, striæ irregularly punctured. Body beneath shining blue; legs fulvous, tibiæ slightly rounded, unguiculi short, obsoletely toothed.

Adelaide, Mr. Wilson.

Common in Collections.

Sp. 8. *Australica ruficeps*, (Boisd.)

Oblongo-elongata, nitida, cupreo-ænea, punctis minutis conspersa, capite pedibusque rubro-ferrugineis.

Long. 3—4 lin.

Chrysomela ruficeps, Boisd. Voy. de l'Astrolabe, 578.

Oblong-elongate, shining cupreous, covered with minute brassy green punctures, head and legs deep red. Head closely punctured; antennæ red, the four or five terminal joints sometimes pitchy, apex of jaws black. Thorax more than twice as broad as long, rounded on the sides, narrowed in front, the anterior margin deeply concave; surface covered with fine brassy green punctures, more crowded and deeply impressed at the sides. Scutellum smooth, impunctate. Elytra parallel in front, rather broader than the thorax, more than three times its length, the apex gradually rounded, sides slightly sinuate behind the shoulders; above convex, slightly excavated towards the outer border in front, surface covered with numerous rows of brassy green punc-

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tures, placed more irregularly towards the margin. Beneath cupreous, with a brassy green reflection; apex of abdomen and the legs deep red; in the last abdominal segment of the male is a large, deep fovea.

Moreton Bay. The late Mr. Strange; Mr. Gibbon.

Common in Collections.

II. *Elytra each with ten rows of punctured striæ, the first abbreviated.*

Sp. 9. *Australica pallida*, n. sp.

Oblongo-elongata, flava, antennis nigris, elytris punctato-striatis.

Long. 4—4½ lin.

Oblong-elongate, pale fulvous. Face coarsely punctured, deeply excavated between the eyes, vertex smooth; antennæ longer than the thorax, basal joint pale fulvous, the two or three following pitchy, the rest black. Thorax twice as broad as long, narrowed from behind towards the apex, the sides subsinuate, suddenly rounded in front, anterior margin excavated, concave, its angles acute; disc smooth, in front and along the base are a few fine punctures, the sides subvariolose. Scutellum triangular, smooth. Elytra parallel, scarcely wider than the thorax, three times its length, subsinuate below the shoulders, the apex rounded; surface distinctly punctate-striate, interstices smooth. Beneath entirely pale fulvous.

In the British Museum and my own Collection.

Sp. 10. *Australica geniculata*, n. sp.

Oblongo-elongata, flava, antennis, genubus tarsisque nigris, elytris punctato-striatis.

Long. 4 lin.

Oblong-elongate, pale fulvous, antennæ, knees and tarsi black. Head rather more prominent than usual, smooth and shining, indistinctly punctured, apex of jaws black; antennæ rather longer than the thorax, the four basal joints pale fulvous. Thorax twice as broad as long, its sides rounded, nearly parallel behind, broader and thicker before their middle, narrowed towards the apex, the anterior angles obtuse, front margin slightly concave; surface convex, smooth and shining, disc finely and sparingly, sides coarsely, punctured. Scutellum impunctate. Elytra subparallel, scarcely wider than the thorax, three times its length, sides

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slightly sinuate below the shoulders, the apex rounded; surface regularly punctate-striate, each stria composed of a single row of impressions, interstices obsoletely raised, subconvex. Beneath pale fulvous; knees, apex of tibiæ and the tarsi black.

North or north-west coast of Australia, Mr. Bynoe.

Two specimens in the British Museum and a third in the Collection of Mr. Waterhouse.

Sp. 11. *Australica crassicornis*, (Fab.)

Oblonga, convexa, pallide fulva, capite maculâ thoracisque fasciis duabus transversis, lineâ longitudinali connexis, nigris; elytris punctato-striatis, singulo maculâ vittâque sinuatâ nigris.

Long. 3—3½ lin.

Chrysomela crassicornis, Fab. Syst. Ent. 99, n. 27; Spec. Ins., i. 122, n. 38; Ent. Syst., i. 321, n. 69; Syst. Eleuth., i. 437, n. 94.

Gonioctena sinuata, Dej. Cat. Col., edit. 3, 427.

Var. A. Capite thoraceque immaculatis, elytris pallide flavis, maculis duabus nigris, posteriore majori oblongâ.

Oblong, convex, pale fulvous. Head closely punctured in front, smooth behind; a frontal patch, the antennæ (their four or five basal joints sometimes excepted), and the palpi, black. Thorax more than twice as broad as long, the lateral margins rounded and narrowed in front; the disc distantly, sides coarsely punctured, on the surface are two short black transverse fasciæ, the first on the anterior margin, the other broader and concave in front, at the base, the two are united by a narrow vertical line the same colour. Scutellum smooth, impunctate. Elytra scarcely wider than the thorax, more than three times its length, the sides parallel in front; surface punctate-striate, on each is a subtriangular spot near the scutellum, and an irregular sinuous vitta, black; the latter, commencing at the humeral callus, extends nearly to the apex of the elytron, it is much broader behind, and frequently interrupted in its middle. Beneath fulvous, sides of the breast and the abdomen stained with piceous; legs black, the base of the thighs and more or less of the tibiæ fulvous.

Var. A. Pale fulvous, six terminal joints of antennæ and two spots on each elytron black.

Moreton Bay, Mr. Gibbon.

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Not uncommon in collections; this species is the *Gonioctena sinuata* of Dejean's Catalogue; the specimen in the Banksian Cabinet, from which the description of Fabricius was drawn, is an extremely pale variety, in which the head and thorax are both immaculate, and the sinuous line abbreviated into an oblong patch behind the middle of the elytron.

Sp. 12. *Australica vittata*, n. sp.

Oblongo-elongata, pallide fulva, elytris profunde punctato-striatis, singulo vittâ longitudinali viridi-æneâ.

Long. 3—3½ lin.

Oblong-elongate, pale fulvous, coarsely punctured, elytra deeply punctate-striate, with a longitudinal stripe on each, brassy green. Head closely punctured, the vertex stained with black; four basal joints of antennæ pitchy, the rest black. Thorax twice as broad as long, the sides rounded, anterior margin concave; disc coarsely punctured, variolose on the sides. Scutellum smooth, fulvous, its apex pitchy. Elytra parallel, scarcely wider than the thorax, more than three times its length, deeply punctate-striate, on the disc of each, and extending nearly to the apex, is a narrow green vitta, the punctures on which are deeper and more confused than elsewhere on the surface; the suture and outer margin narrowly edged with black. Beneath pale fulvous, the tarsi pitchy.

Melbourne, Mr. Barton.

In the collections of the British Museum, Mr. Sheppard, and my own.

The deep puncturing of the elytra at once distinguishes this insect from the allied species.

Sp. 13. *Australica pulchella*, n. sp.

Oblonga, nitidissima, fulva, elytris punctato-striatis, fusco-æneis, margine pallido.

Long. 2½ lin.

Oblong, shining fulvous, elytra brassy brown, their margin pale. Head punctured; antennæ fuscous, the basal joints fulvous. Thorax more than twice as broad as long, sides nearly straight behind, rounded and narrowed before the middle, anterior angles acute, front margin deeply excavated, concave; disc smooth and shining, indistinctly punctate, sides variolose. Scutellum triangular,

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subacuminate, smooth. Elytra parallel, slightly broader than the thorax, more than three times its length, sides subsinuate, apex rounded; surface brassy brown, with a pale fulvous border, punctate-striate, the punctures irregularly placed on the striæ, each of the latter being composed of more than one row of impressions. Beneath entirely fulvous.

In the British Museum and my own Collection.

Sp. 14. *Australica circumfusa*, Chevr.

Oblongo-ovata, convexa, nitida rubra; elytris punctato-striatis, cupreis, margine fulvo, subtus picea, prothorace, sterno femoribusque rubris.

Long. 4 lin.

Oblong-ovate, convex, shining red, elytra cupreous, narrowly margined with pale fulvous. Head smooth, indistinctly punctured, face excavated between the eyes, subrugose; antennæ half the length of the body, black, the basal joint pale fulvous. Thorax three times as broad as long; the sides parallel behind, rounded and narrowed towards their apex, front margin deeply concave, the anterior angles obtuse; surface with a few scattered punctures, smooth and shining. Scutellum smooth, triangular, cupreous. Elytra scarcely broader than the thorax, more than three times its length, their sides nearly parallel, the apex obtusely rounded; above convex, regularly punctate-striate, cupreous, the entire margin pale fulvous; on the sides near the base are placed two shallow foveæ, interstices indistinctly punctured. Beneath with the abdomen pitchy; prothorax, sternum and thighs red.

This insect is unique in the fine Collection of Mons. Chevrolat, who has kindly placed it in my hands for examination; in the length of its antennæ and in shape it forms a link between the present and succeeding sub-genera.

Subgenus 3. Stethomela.

Antennæ dimidii corporis longitudine, subincrassatæ, articulis elongatis. *Prosternum* valde carinatum, antice truncatum, basi bilobatum. *Corpus* robustum, oblongum, convexum. *Pedes maris* articulo tarsorum basali distincte dilatato.

The prosternum is abruptly truncate anteriorly, its lower surface being broad and flat, sometimes grooved.

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Sp. 1. *Stethomela submetallica*, Chevr.

Oblonga, convexa, nitida, rubra, elytris cupreo-æneis, tenuiter punctato-striatis, lateribus infra humeros transversim excavatis.

Long. 4½—5 lin.

Var. A. Cuprea, capitis vertice scutelloque rubris.

Var. B. Supra pallide viridi-ænea, infra flava. (Plate XIV. fig. 5.)

Oblong, shining red, elytra cupreous, finely punctate-striate. Head deeply impressed between the eyes, the vertex sparingly punctured; jaws and antennæ (the 2—4 basal joints excepted) black. Thorax narrowly margined, twice as broad as long, its sides parallel behind, narrowed and rounded in front, anterior margin concave; surface red, coarsely but distantly punctured, more crowded on the sides, the latter stained with metallic brown, which often extends considerably over the disc. Scutellum narrow, triangular. Elytra bright olive green, shining, convex, broader than the thorax and three times its length; surface finely punctate-striate, the punctures irregularly placed on the striæ; below the shoulders is a short, deep, transverse fossa, near the inner extremity of which is a single deep impression. Beneath shining red; prosternal ridge terminating in an obtuse tooth, which is produced beyond the antipectus.

Var. A. Above cupreous, the vertex and scutellum pitchy red.

Var. B. Above pale metallic green, beneath yellow.

Moreton Bay.

In the Collection of Mr. Waterhouse, also in my own Cabinet.

Sp. 2. *Stethomela prasina*, n. sp.

Oblonga, nitida, supra pallide viridis, infra flava; elytris tenuiter punctato-striatis, lateribus infra humeros, punctis nonnullis magnis excavatis.

Long. 5 lin.

Very closely allied to the last species, somewhat larger, paler and without metallic tinge. Above light grass green, the lower portion of the face and antennæ pale yellow. The sides of the thorax less parallel and more rounded in front; its surface rather less convex, more closely punctured, and with a large shallow foveæ on either side; paler in colour than the elytra, the disc being

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slightly tinged with yellow. Scutellum triangular, yellowish green. Elytra more than three times the length of the thorax, distinctly punctate-striate, the punctures irregularly disposed on the striæ; on the sides in front are four or five large shallow depressions. Beneath pale yellow. Apex of prosternum produced into an obtuse tooth.

A single specimen in the British Museum.

Sp. 3. *Stethomela poroptera*, n. sp.

Oblonga, nitida, cupreo-ænea; elytris punctato-striatis, punctis magnis, fortiter impressis, pedibus rufo-piceis.

Long. 5—5½ lin.

Oblong, shining cupreous, with a brassy green reflection. Head shining, finely and sparingly punctured; antennæ half the length of the body, nigro-piceous, the four basal joints rufous. Thorax twice as broad as long, its sides narrowly margined, nearly straight behind, rounded and narrowed towards the apex, sinuate behind the anterior angles, the latter slightly produced, subacute; surface deeply punctured, punctures distinct on the disc, crowded and variolose at the sides. Scutellum triangular, smooth. Elytra convex, parallel in front, broader than the thorax, three times its length, the sides sinuate; surface deeply punctate-striate, each stria consisting of a single row of large, deeply excavated, brassy green punctures, those on the striæ near the suture more closely placed and smaller than the rest. Beneath cupreous, legs pitchy red, tarsi paler.

Richmond River.

In the Collections of the British Museum, M. Deyrolle, Messrs. Sheppard, Waterhouse and my own.

Subgenus 4. Augomela.

Antennæ dimidio corporis breviores, subclavatæ, articulis 2—4 filiformibus, cæteris ad apicem graduatim incrassatis, compressis. *Prosternum* carinatum, basi bilobatum, antice obtuse truncatum, vel dente obtuso productum. *Corpus* ovatum, convexum; *maris* tarsorum articulo basali dilatato.

These insects are the most brilliant of the whole genus, all the known species being highly metallic and iridescent.

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Sp. 1. *Augomela iridea*, n. sp.

Ovata, convexa, nitida, auro-ænea, iridescens, thorace cyaneo marginato, elytris punctato-striatis, margine, suturâ vittâque basali obliquâ, cyaneis.

Long. 4 lin.

Ovate, convex, shining golden green, iridescent, elytra punctate-striate, their outer margin, the suture and an oblique vitta at the base, violet blue. Head deep metallic blue, with a golden green reflection, smooth and shining; antennæ black, the basal joints pale fulvous. Thorax three times as broad as long, its sides rounded and narrowed towards the apex, the latter concave, anterior angles obtuse; surface deeply and distantly punctured, brassy green, disc golden, the entire limb narrowly edged with metallic blue. Scutellum smooth, triangular, its apex obtuse. Elytra broader than the thorax, more than three times its length, the sides ovate, subsinuate in their middle, the apex rounded; above convex, with a shallow transverse fossa below the shoulders, regularly punctate-striate, interstices smooth, impunctate; disc golden, the limb brassy green, the extreme edge of the sutural and outer margins and an oblique longitudinal patch from the base of each elytron, violet blue. Beneath cupreous, the legs pitchy, with a brassy green reflection; thighs more or less red.

Sydney, Moreton Bay. Mr. Gibbon.

In the British Museum, and my own Collection.

Sp. 2. *Augomela pyroptera*, n. sp.

Ovata, convexa, nitida, aurea, iridescens, elytris tenuiter punctato-striatis, fasciâ obliquâ transversâ antice, maculâque triangulari magnâ post medium, viridi-æneis.

Long. 3½ lin.

Ovate, convex, shining golden green, iridescent. Head deeply impressed in front, distinctly punctured, dark metallic green, with a purple reflection; antennæ rather longer than the thorax, black. Thorax twice as broad as long, the sides rounded, narrowing from their base to the apex, anterior angles subacute, front margin concave; surface finely and indistinctly punctured, with a few coarse impressions at the base and sides; disc golden, bordered on the outer margins with brassy green, the extreme base of the thorax and a narrow dorsal line violet blue. Scutellum metallic green, broad, rounded behind, its surface indistinctly punctured. Elytra broader than the thorax, scarcely three times its length,

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the sides ovate, sinuate; above convex, golden-green, finely and regularly punctate-striate, below the shoulders is a deeply impressed, transverse fossa; on the anterior part of the surface is a broad brassy green fascia, which commences beneath the humeral callus and extends obliquely across each elytron to the middle of the suture, on its outer half is a large violet blue stain; behind the middle is placed a large indistinctly defined triangular patch, dull metallic green. Beneath with the legs violet blue.

Richmond River.

Unique, in the British Museum.

Sp. 3. *Augomela hypochalcea* (Germ.)

Ovata, convexa, nitida, auro-ænea, elytris punctato-striatis, fusco- vel atro-violaceis, lateribus viridi-æneis, pedibus cyaneis, tarsis latis.

Long. 3½—4⅓ lin.

Chrysomela hypochalcea, Germ. Lin. Ent., iii. 236.

Var. A. Elytris viridi-aureis, æneo reflectis.

Ovate, convex, shining golden green, elytra dark metallic violet brown or black, brassy green on the sides. Head deep violet blue, impressed on the face, coarsely and irregularly punctured; antennæ rather longer than the thorax, the four or five basal joints pitchy, the rest black. Thorax more than twice as broad as long, the sides rounded, narrowed from the base towards the apex, indistinctly thickened, the front margin concave; surface stained behind and in front with violet blue, minutely and closely punctured, with a few deeper impressions scattered singly over the disc, and rather more crowded at the sides. Scutellum smooth, dark metallic green. Elytra rather broader than the thorax, three times its length, their sides ovate, sinuate behind the middle, the apex obtusely rounded; above convex, regularly and finely punctate-striate, interstices minutely punctured; below the shoulders is an interrupted transverse fossa, extending across the six outer striæ, the latter between the base and middle of the elytron lacunose; surface obscure violet brown or black, tinged with metallic green on the sides and base, on the transverse fossa is a violet blue patch. Beneath with the legs deep blue, the tarsi short and broad, their second joint being equal in width to the third.

Var. A. Elytra golden green, with a brassy tinge.

Adelaide, not uncommon. Var. A. Richmond River.

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Sp. 4. *Augomela pretiosa*, n. sp.

Ovata, convexa, nitida, viridi-ænea, iridescens, elytris punctato-striatis, intersticiis lævibus, impunctatis, pedibus fusco-violaceis.

Long. 3 lin.

Ovate, convex, shining, dark metallic green. Head with a violet iridescence, deeply impressed between the eyes; antennæ black, rather longer than the thorax, the four basal joints pale piceous. Thorax nearly three times as broad as long, the sides rounded, narrowed towards the apex, anterior angles acute, the front margin concave; surface smooth and shining, disc distantly, the sides more closely punctured. Scutellum smooth, triangular. Elytra more than three times the length of the thorax, their sides ovate, sinuate behind the shoulders, the apex obtusely rounded; surface brassy green, with a violet blue iridescence, regularly punctate-striate, interstices smooth, impunctate, below the shoulders is a deep transverse fossa, extending across the four outer striæ. Beneath dark fuscous, tinged with violet blue, sternum bright metallic green; legs violet brown, the femora tinged with brassy green.

Adelaide.

A single specimen in my own Collection.

Sp. 5. *Augomela elegans*, n. sp.

Ovata, convexa, nitida, rubro-ænea, capite thoracisque margine viridi-æneis; elytris tenuiter punctato-striatis, suturâ, margine fossâque transversâ infra humeros, viridi-æneis.

Long. 2¾—3 lin.

Ovate, convex, shining coppery red; the head, margin of thorax, the suture, outer border of elytra, and a transverse fossa below the shoulders of the latter, bright metallic green. Head smooth, vertex brassy green. Thorax three times as broad as long, the sides rounded, narrowed in front, the anterior margin concave; surface smooth and shining, coppery red, the extreme margin brassy green; on the disc are a few single punctures, which are rather more crowded on the sides. Scutellum smooth, triangular. Elytra convex, scarcely wider than the thorax, three times its length, the sides ovate, sinuate below the shoulders, their apex rounded; surface shining, regularly punctate-striate, below the shoulders is a deep transverse brassy green fossa, extending across

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the four outer striæ; the suture, outer margin and a short longitudinal patch, connected at its base with the inner extremity of the transverse fossa, brassy green.

Clarence River. Collected by the late Mr. Strange.
In the British Museum.

The above description is drawn from a highly coloured specimen; the others are paler, and have the green markings less distinct.

Genus 7. Cyclomela.

Antennæ dimidio corporis vix breviores, subincrassatæ, articulis versus apicem graduatim dilatatis, compressis. *Palpi* ovati, articulo primo minuto, secundo tertioque clavatis, penultimo incrassato, ultimo præcedenti breviori, truncato. *Unguiculi* inermes. *Corpus* subglobosum; thorax transversus, apice valde excavatus, postice obtuse productus, subangulatus; elytra thorace latiora, rotundata, convexa, lateribus basi lobatis; prosternum carinatum, *maris* articulo basali tarsorum quatuor anticorum vix dilatato, pulvillo integro, *fœminæ* pulvillo longitudinaliter diviso.

I have founded the above genus on a single species from Moreton Bay, remarkable for its subglobose form, lobed epipleurs and the shape of its thorax, which resembles that of certain *Doryphoræ*.

Sp. 1. *Cyclomela nitida*, n. sp. (Plate XIV. fig. 9.)

Subglobosa, nitida, picea, capite, thorace pedibusque rubris, elytris punctato-striatis, cupreo- vel viridi-æneis.
Long. 4½ lin.

Subglobose, convex, piceous, shining. Head deeply inserted in the thorax, red, impunctate, impressed between the eyes; antennæ black, the two or three basal joints red, more or less stained with piceous above. Thorax more than twice as broad as long, shining red, impunctate; sides narrowed from the base to the apex, nearly straight behind, slightly rounded in front, the anterior margin deeply excavated, its angles produced, obtuse, base obtusely angled in the middle. Scutellum triangular, acute, pitchy red. Elytra much broader than the thorax, four times its length, very convex; sides lobed at their base, then gradually rounded to the apex, the latter obtusely rounded; surface shining cupreous or metallic green, regularly punctate-striate, the interstices indis-

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tinctly punctured; on the sides, below the shoulders, are three or four deep foveæ. Beneath pitchy, legs red, apex of tibiæ pitchy.

Moreton Bay. Mr. Gibbon.

Not uncommon in Collections: in the British Museum and my own Cabinet.

Genus 8. Chalcomela.

Antennæ subclavatæ, thorace vix longiores, articulo basali clavato, tribus proximis subfiliformibus, cæteris ad apicem graduatim incrassatis, compressis, 4-10 brevioribus, 11mo ovato. *Palpi* ovati, articulo primo minuto, secundo tertioque clavatis, penultimo leniter incrassato, ultimo præcedenti æquali truncato. *Unguiculi* non dentati. *Corpus* metallicum, rotundatum; thorax transversus, antice excavatus, sinuatus; elytra thorace latiores, rotundato-ovata, lateribus sinuatis; prosternum inerme; *maris* articulo basali tarsorum quatuor anticorum vix dilatato, pulvillo integro, *fœminæ* pulvillo longitudinaliter divido.

The head is less deeply inserted in the thorax than in *Cyclomela*, and the last joint of the palpi, which is short in the latter, here is equal in length to the third.

Sp. 1. *Chalcomela sulcata*, n. sp. (Plate XIV. fig. 8.)

Rotundata, convexa, nitida, viridi-ænea, elytris sulcato-striatis, striis fortiter punctatis.

Long. 3 lin.

Rotundate, moderately convex above, shining metallic green, with a coppery reflection. Head smooth and shining, deeply grooved between the eyes, on the vertex is a single deep fovea; antennæ black, the four basal joints pitchy. Thorax three times as broad as long; the sides rounded, front margin slightly excavated, sinuate, the middle slightly produced, anterior angles obtuse, base subsinuate on either side, feebly lobed in the centre; surface slightly thickened on the sides, covered with distinct deep but scattered punctures. Elytra convex above, broader than the thorax, four times its length; sides rounded and slightly lobed at the base, sinuate in the middle, then rounded gradually to their apex; surface sulcate-striate, each stria with a single row of deep punctures, interstices smooth, convex.

In the British Museum, the Collections of Messrs. Waterhouse, Sheppard and my own.

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Sp. 2. *Chalcomela illudens*, n. sp.

Rotundata, convexa, nitida, viridi-ænea, iridescens, thorace postice purpureo-fasciato, elytris suturâ anguste, lineâ basali arcuatâ maculâque post medium purpureis.

Long. 3½ lin.

Rotundate, moderately convex, shining metallic green, thorax and elytra with purple markings, visible only in certain lights. Head smooth, between the eyes is a deep transverse groove; antennæ black, the four basal joints fulvous, the third and fourth stained with fuscous at their apex. Thorax shaped as in the former species; its surface indistinctly punctured, disc bright metallic green, the base with a broad purple fascia. Scutellum smooth, triangular. Elytra wider than the thorax, four times its length, the sides rounded, slightly lobed at their base; above convex, regularly and distinctly punctate-striate, the interstices smooth, impunctate, near the outer margin at the base is a large shallow fovea; surface iridescent metallic green, the suture, an arched line at the base and a longitudinal patch below the middle, purple. Beneath metallic brown, tinged with brassy green.

Adelaide?

A single specimen in my own Collection.

Sp. 3. *Chalcomela insignis*, n. sp.

Rotundato-ovata, convexa, nitida, supra auro-ænea, thorace basi purpureo-fasciato, elytris singulo suturâ plagâque purpureis, subtus tote fulva.

Long. 2½ lin.

Rotundate-ovate, convex, above shining golden green, the base of the thorax, the suture and a large irregular patch on each elytron purple; these markings have all a bright metallic green border. Head finely punctured, deeply impressed between the eyes, the lower portion of the face purple, labrum and antennæ fulvous. Thorax three times as broad as long; the sides rounded, narrowed from the base to the apex, anterior margin slightly concave, sinuate, its middle feebly lobed; surface finely punctured, brassy green, a short narrow line on the anterior margin, and a broad fascia at the base, purple. Scutellum triangular, pitchy red. Elytra broader than the thorax, three times its length, their sides rounded, slightly sinuate; surface deeply punctate-striate, the striæ subsulcate, interstices smooth and shining, the suture and a large irregular patch on the disc purple;

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the latter sends a narrow ramus downwards, nearly to the apex; these purple markings, together with the outer border of the elytron, narrowly edged with bright metallic green. Beneath entirely fulvous.

A single specimen in the British Museum.

Sp. 4. *Chalcomela eximia*, n. sp. (Plate XIV. fig. 7.)

Rotundato-ovata, nitida aurea, thoracis basi purpureo-fasciato, elytris suturâ, fasciâ transversâ maculâque post medium, purpureis, antennis articulo tertio elongato.

Long. 3 lin.

Rotundate-ovate, convex, shining golden, deeply impressed between the eyes, and with a longitudinal line on the face; jaws, palpi and antennæ deep purple, the third joint of the latter elongate. Thorax three times as broad as long; sides rounded, narrowed from the base to the apex, anterior margin slightly concave, its middle feebly lobed; surface finely punctured, variolose on the sides, a narrow abbreviated line on the front margin and a broad fascia at the base, purple. Scutellum smooth, purple. Elytra broader than the thorax, three times its length, their sides rounded, subsinuate; above convex, the surface distinctly punctate-striate, the suture, a transverse fascia across the middle, and a round patch behind, purple. Beneath brassy green, a large patch on the abdomen, apex of the thighs, the tibiæ and tarsi, purple.

Unique in the Collection of the British Museum.

Genus 9. Chrysomela, Auct.

Antennæ subfiliformes vel subincrassatæ, compressæ, articulo tertio elongato. *Palpi* clavati, articulo ultimo truncato. *Unguiculi* inermes. *Corpus* oblongum vel ovatum, convexum; thorax transversus, lateribus incrassatis, rarissime planis; prosternum non carinatum.

The Australian species differs from the ordinary European forms of the genus, and perhaps when more are known may be entirely separated from it; I have, however, for the present, made it into a subgenus, of which I have given the following characters:—

Subgenus Micromela.

Antennæ subincrassatæ, thorace vix longiores, articulo tertio elongato, 3-10 brevibus, fere æqualibus, graduatim incrassatis, ultimo ovato, subacuminato. *Palpi* clavati, truncati, articulis tertio et ultimo brevibus æqualibus. *Corpus* rotundato-ovatum, convexum; thorax lateribus non incrassatus.

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Sp. 1. *Micromela cupripennis*, n. sp.

Ovata, convexa, fulva, nitidissima, elytris cupreis, tenuiter punctato-striatis, femoribus subcompressis.

Long. 2 lin.

Ovate, convex, shining fulvous, elytra bright cupreous, finely punctate-striate; thighs slightly compressed. Head finely punctured, impressed between the eyes; antennæ rather longer than the thorax, subclavate, joints scarcely flattened, the last ovate, acuminate. Thorax more than twice as broad as long; the sides rounded, narrowed from base towards the apex, the latter excavated, subsinuate, being feebly produced in the middle, anterior angles obtuse; surface smooth and shining, disc impunctate, on the sides are a few subvariolose punctures. Scutellum smooth, triangular, its apex obtuse. Elytra rather wider than the thorax, three times its length, their sides oval, subsinuate; surface smooth, brilliantly cupreous, finely punctate-striate, the interstices impunctate. Beneath entirely fulvous; the thighs slightly flattened.

Melbourne.

A single specimen of this beautiful insect is in my own Cabinet.

Appendix.

Sp. 1—2. *Lamprolina perplexa*, n. sp.

Elongata, rufa, nitida, thoracis lateribus foveis quatuor, elytris viridi-cæruleis, punctato-striatis, lateribus punctis magnis excavatis.

Long. 5½ lin.

Elongate, shining red, elytra bluish green. Head smooth, with a deep triangular impression between the eyes, antennæ steel blue. Thorax subquadrate, its sides less narrowed in front than in the last species, the anterior angles rather more produced; surface smooth, covered with deep remote punctures; on either side within the margin are two deep foveæ. Scutellum smooth. Elytra rather longer, their apex more acutely rounded; surface shining, finely punctate-striate, at the base and along the sides are placed about ten foveæ, deeper, more distinctly defined and smoother within than those in *L. æneipennis*; abdomen and legs red, tibiæ (their base excepted) and tarsi black, antipectus acutely toothed.

Richmond River.

A single specimen, which I at first overlooked, in the British Museum.

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This insect, although very closely allied to *L. æneipennis*, I have very little doubt is a good species; it differs in size, which approaches *L. grandis*, and in the deeper and more distinct impressions on the sides of its elytra; the apex of the latter is also more pointed.

Sp. 3. *Lamprolina simillima.*

Mr. Gibbon has brought two fine specimens of this species from Moreton Bay; one is in the British Museum, the other in my possession.

SPECIES UNKNOWN TO ME.

Chrysomela sapphira, Fab.

Oblonga, punctatissima, nitida, cyanea.

Fabr. Sys. El., i. 432, n. 57.

Boisd. Voy. de l'Astrolabe, 578, n. 5.

Collection of M. Dejean.

Chrysomela nitidipennis, Dej.

Minor, ferruginea, elytris nitidis, punctis impressis aureo-cupreis.

Assez petite, ferrugineuse, avec les élytres brillantes, marquées de points enfoncés d'un doré cuivreux.

Boisd. Voy. de l'Astrolabe, 578, n. 6.

Notoclea splendens, Mac Leay.

N. splendissimè cuprea, antennis piceis, scutello nigro, thorace postice, elytrorum suturâ maculisque duabus dorsalibus cæruleo-viridibus, elytris novem striis punctorum, subtilissime impressis.

Mac Leay, Append. to King's Survey, ii. 452.

Chrysomela (*Phædon*), *luteicornis*, (Erichs.)

Obovata, convexa, ænea, antennis luteis, pedibus piceo-testaceis, thorace dense punctulato, elytris subtiliter striato-punctatis. Long. 2 lin.

Ch. cochlearecæ magis oblonga, obovata, convexa, ænea, nitida. Antennæ luteæ. Os piceo-testaceum. Frons subtiliter punctulata, subtilissime obsoleteque caniculata, clypeo lineâ angulato obsolete impressâ distincto. Thorax coleopterorum basi arcte applicatus, antrorsum leniter angustatus, latitudine baseos duplo fere brevior, basi medio rotundatus, utrinque sinuatus, lateribus subrectis, angulis posterioribus acutiusculis, haud prominulis, anterioribus subrotundatis, leviter convexus, dense et minus subtiliter punctulatus. Scutellum lævе. Co-

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leoptera convexa, subtiliter striato-punctata, punctis apice obsolescentibus, intersticiis omnium subtilissime transversim strigosis. Pedes piceo-testacei, femoribus posterioribus æneo-nitentibus.

Erichs. Arch. für Nat., 1842, 231.

Tasmania.

Chrysomela (*Phædon*), *orphana*, (Erichs.)

Subhemispherica, nigro-ænea, antennis, ore pedibusque flavis, thorace crebre punctato, elytris punctato-striatis, intersticiis punctulatis.

Long. 1½ lin.

Statura *Chr. tumidulæ*, sed paulo minor, subhemispherica, convexa, nigro-æneæ, nitida. Antennæ flavæ. Caput fronte sparse punctulatâ, clypeo lineâ subtili impressâ a fronte distincto, ore flavo-testaceo. Thorax basi coleopterorum arcte applicatus, antrorsum angustatus, latitudine baseos triplo fere brevior, basi rotundatus, apice emarginatus, lateribus angulisque posterioribus subrectis; transversim convexus, æqualis, crebre minus subtiliter punctatus. Scutellum læve. Coleoptera sat fortiter punctato-striatis, intersticiis subtiliter punctulatis. Pedes flavi.

Erichs. Arch. für Nat., 232.

Tasmania.

EXPLANATION OF PLATE XIV.

Fig. 1. *Phyllocharis cyanipennis.*
1*a*, antenna; 1*b*, palpus; 1*c*, unguiculi.

2. *Lamprolina æneipennis.*
2*a*, antenna; 2*b*, palpus; 2*c*, unguiculi; 2*d*, antipectum.

3. *Eulina Curtisii.*
3*a*, antenna; 3*b*, palpus; 3*c*, unguiculi.

4. *Chalcolampra thoracica.*
4*a*, antenna; 4*b*, palpus.

5. *Australica* (*Stethomela*) *submetallica*, var.
5*a*, *b*, *c*, details of *Australica Curtisii*. 5*a*, antenna; 5*b*, palpus; 5*c*, unguiculi.

6. *Chalcolampra pustulata.*

7. *Chalcomela eximia.*

8 *Chalcomela sulcata.*
8*a*, antenna; 8*b*, palpus.

9. *Cyclomela nitida.*
9*a*, antenna; 9*b*, palpus; 9*c*, thorax.

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XXV. *Characters of Two undescribed Species of* Thrips, *Lin.* *By* Edward Newman, Esq., F.L.S. &c.

[Read 3rd December, 1855.]

Our Secretary having obligingly placed in my hands a few specimens of *Thrips*, which he has just received from a member of our Society, Major Hamilton, now stationed at Mysore, I beg to submit to the Society the following brief notes resulting from a cursory examination of them, and from a reference to those works in which they were likely to be described.

Class NEUROPTERA. Order THRIPSINA.

The Bibliography of the order *Thripsina* may be said to be exclusively in the hands of Mr. Haliday: I am aware that species have been described by Linnæus, Fabricius, Kirby, Müller, Burmeister, Amyot, Heeger and others, but the collection and arrangement of the scattered and somewhat crude descriptions of other writers has been undertaken and achieved by that accomplished Entomologist, who has interwoven his materials with a mass of original observations that confers the chief value on the digested summary. Mr. Haliday's papers on *Thrips* were published in the Third Volume of the Entomological Magazine, pp. 439—551, in the year 1836, and in the fourth part of the Catalogue of Homopterous Insects in the British Museum, pp. 1094—1118, in the year 1852. In both instances the group is called an "order," and named, in the first instance, *Thysanoptera*, in the second, *Physapoda*, the termination of the first name appearing to indicate that the learned author considered the *Thripsina* an equivalent group to *Hemiptera* and *Orthoptera*, with which he especially contrasts it; and the second implying a sectional or secondary division, such an one in fact as they occupy as a portion of the *Homoptera* in the Museum Catalogue. Be this as it may, I learn from Mr. Haliday himself that he is about to undertake a complete revision of his previous labours, which revision he will doubtless accompany with a careful consideration of the position and rank held by the *Thripsina* in the insect world. Until the publication of his views I shall continue to regard them as forming an intrinsic and essential portion of the restricted class *Neuroptera*, with which the metamorphosis and alary characters are in

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exact accordance, and from which the cibarian organs differ simply in amount of development, not in actual structure.

The genera *Idolothrips* and *Phlæothrips* of Haliday, chiefly distinguished from each other by the greater or less degree of proximity between the single ocellus and the pair, appear to me to rest on very doubtful and therefore unsatisfactory diagnostics; and although the species about to be described are clearly referrible, the first to *Idolothrips*, the second to *Phlæothrips*, I find they so closely resemble each other that the differences seem rather those of magnitude, of sex, or, at most, of species, than of any higher value; characters indeed, which, if made the foundation of genera, seem likely to induce that minute subdivision which, in too many instances, is becoming not only the stumbling-block of the student, but the opprobrium of our science.

Genus Idolothrips, Haliday, l. c.

Caput longissimum, teres. *Antennæ* graciles, 8-articulatæ, thoracis latitudinem triplo vel quadruplo superantes. *Labipalpi* papilliformes. *Ocelli* tres, anticus distans, remotus ab antennarum basi. *Prothorax* inæqualis, tuberculatus. *Alæ* quatuor, anticarum radius unicus, prope basim divaricatus, fere obsoletus. *Abdomen* elongatum, excavatum.

These characters are slightly altered and modified from those given in the Museum Catalogue, which are "compiled from Mr. Haliday's MSS."

Sp. 1. *Idolothrips Halidayi*, Newman.

Nigerrima, glaberrima; antennis gracilibus, flavis, basi apiceque nigris; capite elongato, cylindraceo, nigro-piceo; alis fuliginoso-hyalinis, eradiis, nigro-ciliatis; tarsis læte flavis; abdomine valde elongato, pedetentim attenuato, segmento apicali cylindraceo, longissimo.

Corp. long. ·25 unc. Alarum dilat. ·2 unc.

Head three times as long as broad, cylindrical, pitchy black; eyes large, lateral, oblong, seated at the anterior extremity of the head; antennæ very slender, 8-jointed; the first and second joints robust, slightly incrassated exteriorly, black, the apex of the second tinged with yellow; the third very slender, longer than those next following and pale yellow; fourth, fifth and sixth slender, slightly incrassated externally, and pale transparent yellow, tipped with black; seventh rather shorter, subfusiform, and entirely black; eighth extremely slender, fusiform, very acute, and

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entirely black. *Prothorax* broader than long, anterior and posterior margins straight, anterior as broad as the head, posterior double that breadth, lateral margins sloped diagonally from the anterior margin half way to the posterior, but, as regards their posterior half, straight and parallel; pronotum impressed with wide irregular foveæ; meso- and metathorax uniform in breadth with the base of the prothorax. *Abdomen* very long, gradually tapering to an acute point, which is armed with a few bristles: the thoracic segments and abdomen are black and shining. *Wings* nearly transparent, but with a slightly smoky tinge; at the base they have a median ray, which seems almost immediately to divide, and to be lost in the costal and posterior margins, which are fringed with long silky black hairs. *Legs* rather short; femora very slightly incrassated externally, black and shining; tibiæ bright yellow; tarsi 2-jointed, basal joint moderately long, the apical joint short, obtuse, brown.

Hab. Mysore; feeds on the leaves of a species of Anacardium.

Genus Phlæothrips, Haliday, l. c.

Caput oblongum, depressum. *Antennæ* graciles, 8-articulatæ, thoracis latitudinem perpaullum superantes. *Labipalpi* ovati. *Ocelli* tres, æquidistantes. *Prothorax* foveolatus. *Alæ* anticæ vena unica nonnisi inchoata, vel abbreviatæ aut nullæ. *Abdomen* lateribus muticum.

The characters are chiefly from the Museum Catalogue.

Sp. 1. *Phlæothrips Anacardii*, Newman.

Nigerrima, glaberrima; capite paullum elongato, cylindraceo, piceo; antennis gracilibus, stramineis, basi apiceque nigris; abdomine vix elongato, lateribus rectis, fere ad apicem parallelis, tunc obliquis, in segmento apicali brevi, cylindraceo, desinientibus; alis diaphanis, eradiis, fusco-ciliatis; femoribus perpaullum incrassatis; tarsis stramineis.

Corp. long. ·175 unc. Alar. dilat. ·15 unc.

Head more than twice as long as broad, cylindrical, pitchy black, having at its anterior extremity two very conspicuous bright ocelli seated between the large lateral, oblong, compound eyes: antennæ very slender, 8-jointed, the first and second joints robust, and distinctly restricted at the base, incrassated at the apex, the apex of the second yellow; third extremely slender, twice as long as the second, and pale straw-coloured; fourth, fifth and sixth of equal

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length, but all rather shorter than the third, elongate, pyriform, straw-coloured, tinged with brown externally; seventh long-ovate, shorter than the preceding three, black; eighth short, slender, black. *Thoracic segments* nearly as described in *Idolothrips Halidayi*, see ante, p. 265. *Abdomen* rather robust, its sides parallel to near the apex, when it diminishes, rapidly terminating in a short cylindrical apical segment. *Wings* without rays, hyaline, with long brown cilia. *Legs* black, with straw-coloured tarsi; all other parts black and shining.

Hab. Mysore, feeds on the leaves of a species of Anacardium.

These two species are so similar in many respects, that coming, as they did, without any indication of their being distinct, and being found feeding in company on the leaves of the same plant, I thought it possible that they might be sexes of one species, the lesser the male, and the larger, with its long tubular terminal abdominal segment, the female: such a conclusion, however, being diametrically at variance with the published generic characters, I prefer waiving my first impressions and regarding them as perfectly distinct. The following extract from Major Hamilton's letter to Mr. Douglas contains all the information we possess respecting them—"I enclose with this some dried specimens of a small insect we found in the jungle a short time back; they were feeding on the leaves of a species of Anacardium, which I believe to be *A. semicarpus*. *R. Hamilton, Major 1st Regiment Native Infantry.*" The letter is dated "*Mysore, 2 September*, 1855."

Postscript.—The foregoing notes having been submitted to Mr. Haliday by the Publication Committee, and their publication being recommended, I take the liberty of making the following extract from that gentleman's most courteous note:—"The communication is the more interesting as nothing was previously recorded of the habits of the genus *Idolothrips*, which appears to be very widely diffused, as we now know of its occurrence in Australia, collected by Mr. Darwin; in South America, described and figured by Heeger in the Proceedings of the Vienna Academy, vol. ix. 1852; in Columbia, several species from whence, collected by M. Buquet, are in the cabinet of the British Museum; in Ceylon, collected by Mr. Templeton; and now, collected by Major Hamilton, in continental India."

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XXVI. *Descriptions of various Species of the Coleopterous Family* Pselaphidæ, *Natives of New South Wales and South America. By* J. O. Westwood, Esq., F.L.S., *&c.*

[Read October 1, 1855.]

The remarkable habit possessed by many of the species of *Pselaphidæ*, in common with the equally curious family *Paussidæ*, of taking up their residence in ants' nests, has been the means of our becoming acquainted with a considerable number of species of the former family, which would probably have long remained unknown had not the desire of obtaining additional species of *Paussidæ* led to the careful examination of the nests of those insects in which both happened to make their abode. This desire was strongly entertained by the late Mr. Melly, who requested his various correspondents, both in New Holland and South America, to inspect the nests of the *Formicidæ*, in the hope of capturing *Paussidæ*; the result of which was, that he succeeded in obtaining a number of *Pselaphidæ* from New Holland, together with one very remarkable species from Brazil, all of which were placed in my hands for illustration and description. To these I have added two other very remarkable species, lately captured in Brazil by Mr. Bates, who has also succeeded in finding a considerable number of species of different parts of Brazil.

It is remarkable that the species of this curious little family appear to be distributed over the whole surface of the globe. Besides the European species (which have exercised the Entomological talents of Reichenbach, Leach, Denny, Schmidt, and especially M. Aubé, &c.), those of North America have been ascertained to be very numerous, and have formed the subject of a very excellent treatise by Mr. Leconte, of which an abstract has been published in the Proceedings of our Society. Various additional species, from Algeria, the Cape of Good Hope, Western Asia, Central America, Cayenne, Brazil and Chili, have been also described by M. Aubé and other recent writers, whilst a species of *Batrisus* (*B. australis*), from New Holland, was described by Dr. Erichson from Van Diemen's Land, and a species of *Articerus*, discovered in ants' nests in New Holland, was described by Mr. Hope in our Transactions (vol. iv., p. 106, pl. 8), under the name of *Articerus Fortnumii*. I have now the pleasure

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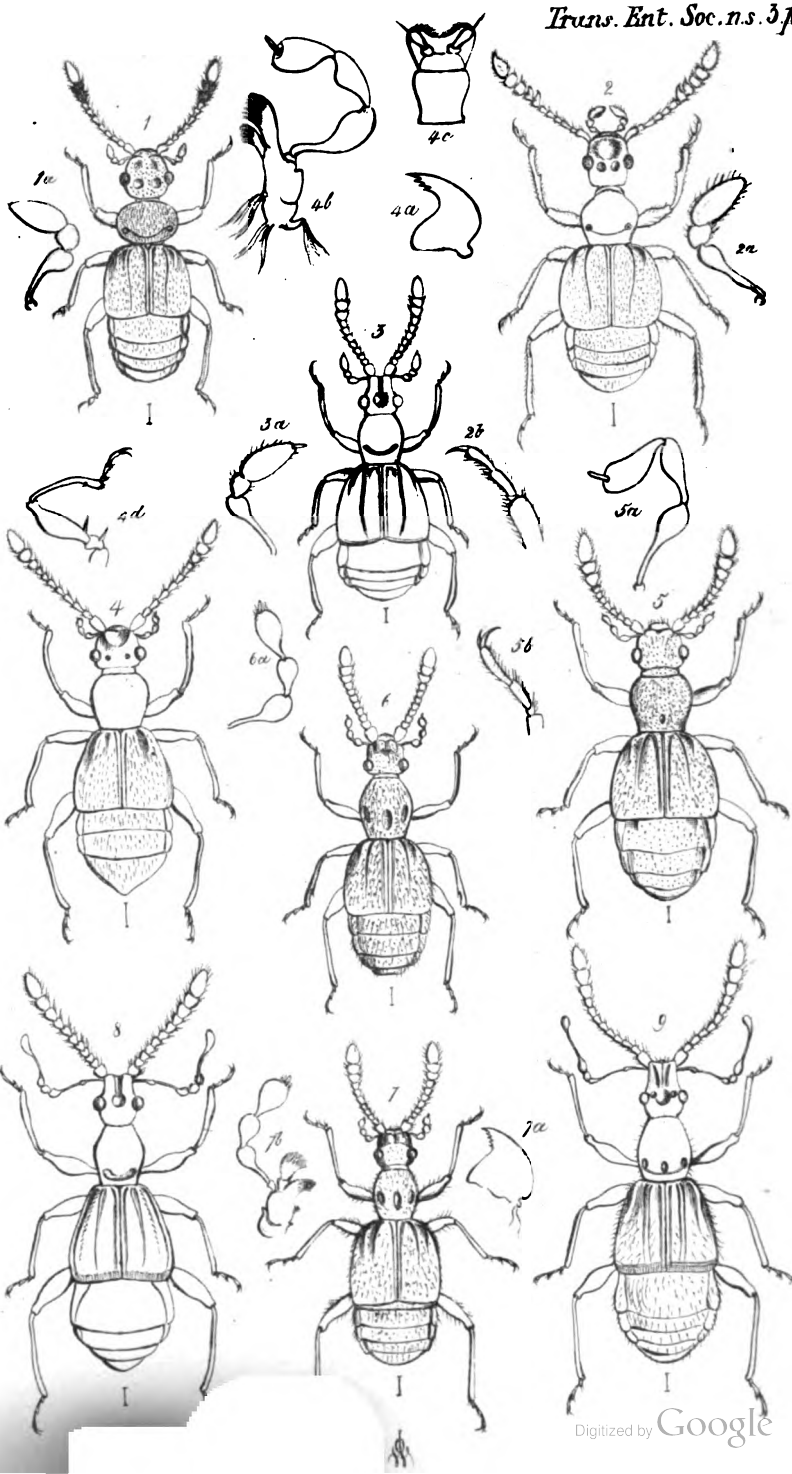

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to add several additional species to the last named most anomalous genus.

Hitherto, so far as I am aware, no species of this family has been described from India or Eastern Asia, but we learn from Mr. Bowring that he has met with numerous species in Siam and China.

SPECIES FROM NEW HOLLAND.

Genus Bryaxis, Leach.

Sp. 1. *Bryaxis strigicollis*, Westw. (Plate XVI. fig. 1.)

Castaneus, elytris pone medium pallidioribus, capite obscuriori; antennis, palpis et pedibus castaneo-fulvis, articulis 9 et 10 antennarum nigris; capite postice profunde bi-impresso, prothorace transverso-rotundato, supra striolis minutis, lineaque curvata postica cum punctis duobus magnis lateralibus, elytris linea profunda submedia impressis.

Long. corp. lin. 1¼.

Habitat in formicetis, Melbourne.

In Mus. Melly.

Caput breve-ovatum, supra punctatum, vertice utrinque versus angulos anticos impressione minuta punctisque duobus magnis profundis inter partem posticam oculorum. Palpi maxillares mediocres, articulo 2ndo apice subito clavato, 3tio cyathiformi, 4to majori ovali, apice subacuto; antennæ formæ ordinariæ, articulis 9 et 10 præcedentibus majoribus cyathiformibus nigris, ultimo adhuc majori ovato, apice subacuto. Caput postice in collum breve contractum. Prothorax capiti vix longitudine æqualis, at parum latior, transverso-ovatus, lateribus regulariter rotundatis, puncto magno utrinque prope angulum posticum rotundatum, lineaque curvata impressa inter puncta; disco creberrime striolato. Elytra prothorace tertia parte latiora semi-ovata, angulis humeralibus rotundatis; tenuissime punctata, striola subsuturali, alteraque discoidali paullo curvata fere ad apicem elytrorum extensa, cum plicatura humerali. Abdomen supra tenuissime punctatum, segmentis lateraliter marginatis integris, simplicibus. Pedes mediocres, tarsorum articulo 2ndo in omnibus reliquis latiori.

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Sp. 2. *Bryaxis quadriceps*, Westw. (Plate XVI. fig. 2.)

Rufo-castaneus, politus; sub lente forte punctatissimus et setosus, antennarum articulis 7, 8, 9 et 10mo nigricantibus, abdomine setulis minutissimis parce vestito; antennarum articulis 7 et 8 intus uncinatis; capite oblongo, vertice antice in medio declivi fossulisque duabus inter oculos; prothorace truncato-ovato, linea curvata impressa postica cum punctis duabus magnis lateribus; tibiis anticis pone medium late emarginatis; (mas).

Long. corp. fere lin. 1½.

Habitat in formicetis, Melbourne.

In Mus. Melly.

Præcedenti elegantior, pedibus longioribus, capiteque oblongo, antennarum articulis intermediis tibiisque anticis emarginatis distinctus. Caput oblongo-subquadratum, antice subtruncatum, angulis posticis rotundatis; supra læve, antice impressione magna rotundata, alterisque duabus minoribus profundis inter oculos. Palpi maxillares articulo secundo ad apicem modice inflato, 4to ovali subacuminato. Antennæ longiores, articulo basali longo curvato, 6to præcedenti parum minori subovali, 7mo et 8vo intus acute productis, 9no transverso, 10mo subquadrato, 11mo ovali apice acute producto. Caput postice in collum breve constrictum. Prothorax capite vix latior, latitudine longitudinem ejus vix superante; truncato-cordatus; latitudine majori ante medium posita, angulis posticis subacutis et ad basin elytrorum applicatis lævis, utrinque pone medium puncto magno laterali notatus; punctis linea curvata impressa connexis. Elytra lata, subrotundata, creberrime punctata, striola subsuturali alteraque discoidali, hac subcurvata et postice paullo abbreviata, cum plicatura humerali. Abdomen creberrime punctatum, segmentis ad latera marginatis. Pedes longiores tenues. Tibiæ anticæ intus pone medium late emarginatæ, emarginatura ad apicem extensa. Tibiæ posticæ paullo curvatæ. Tarsi graciles.

Sp. 3. *Bryaxis atriventris*, Westw. (Plate XVI. fig. 3.)

Obscure castaneus, pernitidus, abdomine nigricanti; pedibus, antennis et palpis fulvo-rufis; antennarum articulis tribus ultimis præcedentibus multo majoribus, capitis angulis anticis porrectis; prothorace subovali, pone medium linea cur-

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vata profunde impressa; elytrisque striola submedia profunda, notatis.

Long. corp. lin. 1.

Habitat in formicetis, Melbourne.

In Mus. Melly.

Caput oblongum, oculis magnis prominentibus, lateribus ante oculos rectis, angulis anticis prominentibus, margine antico in medio subemarginato, linea media longitudinali profunde impressa e margine antico ad verticem extensa, ubi in foveam rotundatam inter oculos desinet. Palpi maxillares mediocres, articulo 2ndo ad apicem subito inflato, 3tio ovali acuminato, apice appendicula brevissima filiformi instructo. Antennæ formæ ordinariæ, articulo basali brevi crasso, intermediis simplicibus, tribus apicalibus dilatatis. Prothorax doliiformis, lateribus rotundatis, antice et postice truncatus, latitudine majori in medio posita; linea curvata profunda postica. Elytra semi-ovata, humeris rotundatis haud prominulis, singulo stria subsuturali alteraque curvata discoidali, striola parva intermedia basali adjecta. Abdomen brevius, segmentis lateraliter marginatis. Pedes mediocres; femoribus crassis, tibiis parum curvatis, tarsis simplicibus.

Genus Tyrus, Aubé.

Sp. 4. *Tyrus spinosus*, Westw. (Plate XVI. fig. 4.)

Niger, pernitidus et sub lente setosus, capitis vertice antice truncato et declivi, inter oculos impressionibus duabus minutis instructo, angulis anticis ad basin antennarum elevatis, clypeo semiovali, facie antice picea, antennis castaneis, articulis 7—10mo obscure piceis; prothorace piceo, elytris sanguineis, humeris valde elevatis, sutura et apice nigricantibus; abdomine nigro, apice piceo-rufo; pedibus castaneis, coxis et basi femorum anticorum bispinosis.

Long. corp. lin. 1½.

Habitat in formicetis, Melbourne.

In Mus. Melly.

Caput breve, antice rotundatum, postice in collum breve constrictum, lateribus ante oculos antice convergentibus; angulis anticis ad basin antennarum elevatis; vertice antice truncato punctisque duobus minutis verticalibus inter oculos positis. Clypeus semiovalis. Mandibulæ breves, subtrigonæ, ad apicem intus acute productæ et denticulis 4 minutis

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acutis armatæ. Maxillæ bilobatæ, lobis setosis; palpi maxillares articulo basali brevissimo, 2ndo longo curvato clavato, 3tio subovali intus subtriangulariter producto, 4to paullo majori ovato apice extus obliquo, seta brevissima terminato. Mentum subcordato-truncatum, labium majus cordatum, palpis labialibus brevibus biarticulatis apice seta instructis. Antennæ subelongatæ, articulis formæ ordinariæ. Prothorax capite paullo latior, angulis anticis rotundatis, truncato-subcordatus lævis, angulis posticis subacutis, latitudine majori longe ante medium posita. Elytra semi-ovata, prothorace multo latiora, angulis humeralibus rotundatis, humeris valde elevatis, striola tenui subsuturali plicaturaque humerali profunda. Abdomen segmentis latis, lateraliter marginatis, subsetosis. Pedes mediocres, tibiis ante apicem intus curvatis, tarsis gracilibus simplicibus.

Sp. 5. *Tyrus humeralis*, Westw. (Plate XVI. fig. 5.)

Castaneus, nitidus, creberrime punctatus et setosus, antennarum articulis tribus ultimis castaneo-nigris; capite subrotundato; prothorace truncato-cordatus, fossula parva media postica; elytris magnis, semi-ovatis.

Long. corp. lin.

Habitat in formicetis, Melbourne.

In Mus. Melly.

Caput mediocre, subrotundatum, vertice antice in medio inciso, angulis anticis lateralibus ad basin antennarum prominulis; supra læve. Clypeus semi-rotundatus. Palpi maxillares elongati, articulo 2ndo ad apicem subito inflato, 3tio elongato ovato, basi tenui; 4to oblongo-ovali, basi attenuato, apice extus obliquo setula apicali instructo. Antennæ mediocres formæ ordinariæ. Caput postice in collum breve constrictum. Oculi mediocres, prominentes. Prothorax cordato-truncatus capite latior, latitudine majori longe ante medium posita, angulis posticis acutis et ad basin elytrorum arcte applicatis, disco creberrime punctato et setoso, fossula minuta ovali media paullo ante scutellum impressus. Elytra semi-ovata, creberrime punctata et setosa, stria subsuturali altera dimidiata discoidali, cum plicatura humerali. Abdomen ovale, segmentis latis, lateraliter marginatis, 2ndo supra longitudinaliter bi-impresso. Pedes mediocres, tibiis paullo curvatis, tarsis simplicibus.

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Genus Batrisus, Aubé.

Sp. 6. *Batrisus angulatus*, Westw. (Pl. XVI. fig. 6 mas, 7 fem.)

Totus obscure castaneo-rufus, vix nitidus, punctatissimus, longe setosus, oculis nigris, antennarum articulis simplicibus, palporum maxillarium articulis 2, 3 et 4 globoso-inflatis, prothorace subhexagono fossula abbreviata media, tibiisque intermediis in mare intus spina subapicali armatis.

Long. corp. lin. 1.

Habitat in Nova Hollandia, Melbourne; in formicetis.

In Mus. Melly.

Caput subquadratum, oculis prominentibus, clypeo semi-rotundato, vertice antice in tubercula duo rotundata parum elevato, in qua insident antennæ formæ ordinariæ, parum elongatæ, articulis tribus ultimis clavam fingentibus. Mandibulæ parvæ, planæ, extus rotundatæ, intus ad apicem in dentem parvum acutum productæ, denticulis tribus aut quatuor minutis, intus subtus basin adjectis. Maxillæ bilobatæ, spina parva intus versus basin setulisque nonnullis fasciculum parvum formantibus in medio marginis interni. Palpi maxillares articulis 2, 3 et 4 ad apicem globoso-inflatis, ultimo ad apicem intus setulis minutis instructo. Prothorax oblongus subhexagonus, latitudine majori in medio posita, disco in medio fossula parva abbreviata aliisque duabus versus angulos laterales impresso. Elytra semi-ovata punctatissima, setosa; striola suturali; altera discoidali e basi ad medium fere extensa, cum plicatura ordinaria humerali. Abdomen ovale, segmentis subæqualibus, lateraliter marginatis. Pedes mediocres graciles, simplices; tibiæ intermediæ in mare spina parva paullo ante apicem intus armatæ. Tarsi unguiculis duobus inæqualibus instructi.

Genus Pselaphus, Herbst.

Sp. 7. *Pselaphus geminatus*, Westw. (Pl. XVI. fig. 9.)

Totus castaneus, pedibus fulvescentibus; antennis gracilibus, nodis palporum maxillarium crassis, capite inter oculos excavato et bipunctato, prothorace versus basin 3-impresso, impressionibus striola curvata transversa conjunctis; elytris subtrigonis, singulo striola suturali alterisque duabus approximatis discoidalibus notato.

Long. corp. lin. 1.

Habitat in Nova Hollandia, Melbourne; in formicetis.

In Mus. Melly.

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Pselapho Herbstii similis, antennis autem gracilioribus, clava minori, nodis palporum paullo crassioribus apice vero minori, prothorace postice latiori. Caput oblongum, oculis prominentibus, margine antico in medio emarginato, vertice antice longitudinaliter sulcato, sulco in fossam magnam rotundam inter oculos extenso, punctisque duobus magnis inter fossam et oculos. Antennæ sub-graciles; palpi maxillares longissimi, nodis crassis apice vero minori. Prothorax conico-ovatus, truncatus, latitudine majori pone medium posita; fossulis tribus parvis ovalibus versus marginem posticum positis, striola curvata subbasali conjunctis. Elytra subtrigona truncata extus setosa, striola suturali, alterisque duabus contiguis discoidalibus plicaturaque elongata humerali. Abdomen latum segmento 2ndo magno, posticis brevibus æqualibus. Pedes graciles elongati, femoribus in medio incrassatis.

Sp. 8. *Pselaphus Antipodum*, Westw. (Plate XVI. fig. 8.)

Totus ferrugineo-castaneus, palpis gracilibus, capite fossula longitudinali e margine antico ad medium verticis extensa, ubi in foveam magnam rotundam inter oculos dilatat; prothorace subhexagono, fossula curvata prope basin notato; elytris subconicis striola suturali alteraque discoidali curvata impressis.

Long. corp. lin. 1.

Habitat in Nova Hollandia, Melbourne; in formicetis.

In Mus. Melly.

Pselapho Herbstii affinis, at palpis gracilioribus et prothorace latiori et magis angulato. Caput oblongum, antice emarginatum. Oculi prominentes, fossula longitudinali e margine antico ad medium verticis extensa, ubi in impressionem magnam rotundam inter oculos desinet. Antennæ subgraciles formæ ordinariæ. Palpi maxillares graciles, nodis crassis. Prothorax oblongo-subhexagonus, latitudine majori ad medium posita, lævis, fossula curvata transversa prope basin posita. Elytra subconico-truncata, angulis posticis rotundatis, striola suturali, altera curvata discoidali, apicem versus sensim attenuata, striola punctorum subhumerali cum plicatura humerali. Abdomen parte postica elytrorum latitudine æquali, segmentis inæqualibus. Pedes graciles, femoribus in medio incrassatis.

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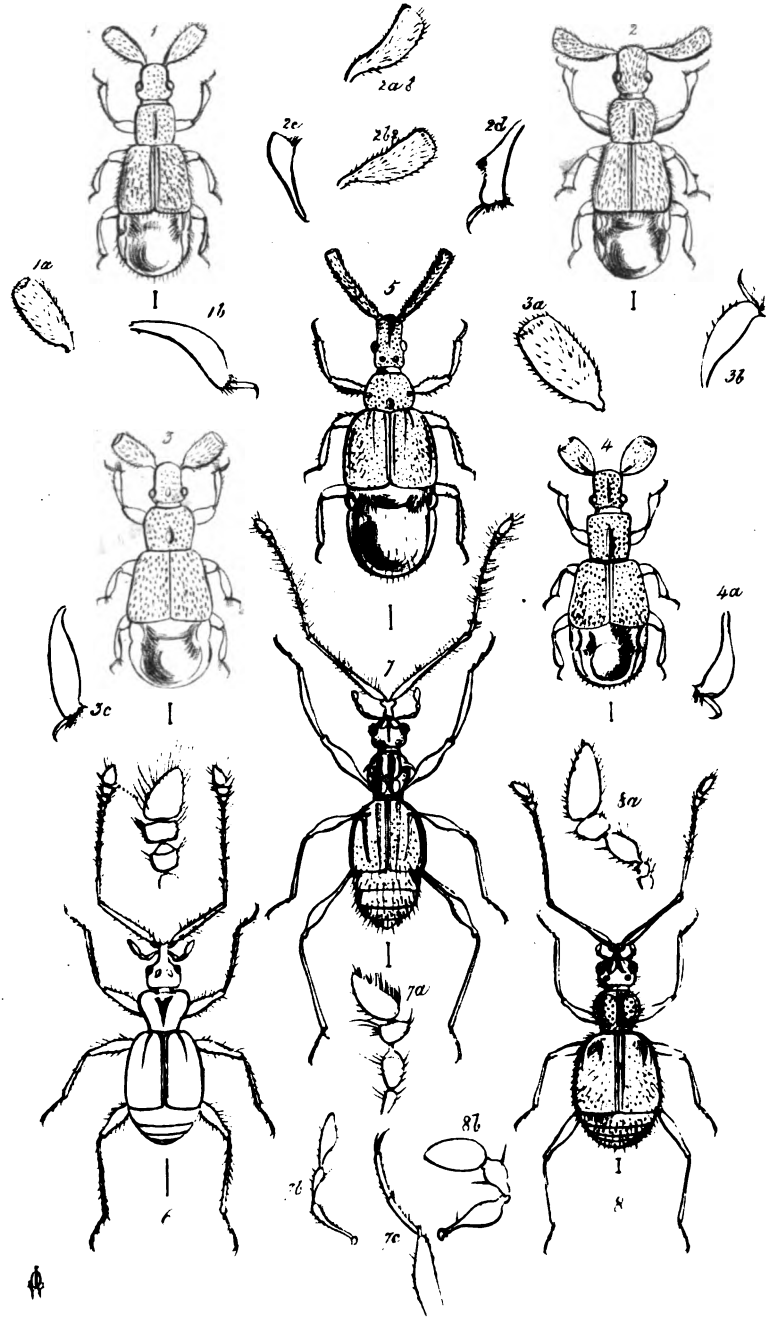

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Genus ARTICERUS, Dalman.

Sp. 9. *Articerus curvicornis*, Westw. (Plate XVII. fig. 2.)

Ferrugineo-fuscus, obscurus, punctatus, luteo-setosus (præsertim ad apicem elytrorum), hoc et sutura obscurioribus; abdomine nitido, magis castaneo; antennis maris elongato-obconicis curvatis, tibiis intermediis maris extus in medio angulatis, intus prope apicem in spinam acutam productis; prothorace subquadrato, angulis anticis lateralibus rotundatis.

Long. corp. lin. 1.

Habitat in Nova Hollandia, Melbourne; in formicetis.

In Mus. Melly.

Articero Fortnumi, Hope (Trans. Ent. Soc. iv. pl. 7, f. 1) affinis; differt autem antennis maris curvatis, nec in medio constrictis, tibiisque intermediis in eodem sexu extus angulatis. Caput oblongum, postice in collum breve constrictum, angulis anticis rotundatis. Antennæ maris latitudine capitis fere duplo longiores, e basi fere ad apicem sensim dilatatis, in medio intus curvatis, setosis; fœminæ paullo breviores, latere interno fere recto, externo vero paullo curvato, tertia parte apicali æquilato, apice truncato. Prothorax subquadratus, angulis anticis subrotundatis, lateribus pone medium paullo intus convergentibus, fossula media longitudinali nec basin nec apicem prothoracis attingente. Elytra conico-truncata setosa, striola suturali impressa. Abdomen lateribus elevatis, basin versus utrinque setigeris. Pedes antici maris tibiis apicem versus extus rotundatis, intus angulatis spinulisque brevibus armatis; intermediis in medio extus angulatis, ad apicem rotundatis intus ad apicem in spinam productis; posticis simplicibus. Pedes omnes in fœmina simplices, absque spinis.

Sp. 10. *Articerus angusticollis*, Westw. (Pl. XVII. fig. 1.)

Rufo-brunneus, obscurus, punctatus, luteo-setosus; capitis lateribus ante oculos subconvergentibus; antennis rectis, sublatis; prothorace oblongo, fossula discoidali; pedibus simplicibus, tibiis curvatis, extus rotundatis.

Long. corp. lin. 1.

Habitat in Nova Hollandia, Melbourne; in formicetis.

In Mus. Melly.

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A. curvicorni similis colore, magnitudine et statura, attamen e fœmina hujus speciei differt antennis rectis prothoraceque angustiori. Caput minus oblongum, lateribus ante oculos convergentibus, postice in collum breve constrictum. Antennæ sublatæ, rectæ, e basi ad medium sensim dilatatæ, setosæ, apice truncatæ; capite toto paullo longiores. Prothorax oblongus, lateribus paullo curvatis, latitudine majori in medio posita. Elytra postice minus dilatata, punctata, setosa, striola suturali. Abdomen ut in reliquis. Pedes satis graciles, simplices; tibiis paullo curvatis et sensim latioribus, margine externo rotundatis.

Sp. 11. *Articerus dilaticornis*, Westw. (Plate XVII. fig. 4.)

Rufo-brunneus, vel subcastaneus; antennis pedibusque magis rufescentibus, obscurus, undique, nisi abdomine, squamis luteis obsitus; capite oblongo, antice parum latiori, angulis anticis rotundatis; antennis brevibus subovalibus, prothorace subquadrato, tibiis quatuor anticis intus prope apicem spinula parva incurva armatis.

Long. corp. lin. 1.

Habitat in Nova Hollandia, Melbourne; in formicetis.

In Mus. Melly.

E præcedentibus differt capite et prothorace magis quadratis, illo antice paullo latiori, hoc subacutangulo antennisque subovalibus. Caput postice in collum breve constrictum, vertice inter oculos longitudinaliter impresso, margine antico clypei subrotundato, angulis anticis lateralibus rotundatis. Antennæ breves, ovatæ, fere capitis magnitudine. Prothorax paullo longior quam latus, lateribus rectis at postice sensim convergentibus, disco longitudinaliter in medio impresso, impressione ante medium obliterata. Elytra densius squamosa, striola tenui suturali. Abdomen subovatum, in medio supra fortiter depressum, lateribus cavitatis setosis. Pedes omnes cum femoribus latis, intermediis ad basin spinula minuta curvata armatis; tibiis omnibus basi attenuatis, 4 anticis intus prope apicem spina minuta armatis.

Sp. 12. *Articerus setipes*, Westw. (Plate XVII. fig. 3.)

Brunneo-castaneus, punctatus, luteo-squamosus, capite parvo; antennis ovalibus, basi constrictis; prothorace truncato-cor-

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dato, fovea brevi centrali pone medium posita; elytris absque striola suturali, tibiis ad apicem longe setosis.

Long. corp. lin. 1.
Habitat in Nova Hollandia, Melbourne; in formicetis.
In Mus. Melly.

E præcedentibus forma capitis, prothoracis, tibiarumque valde distinctus. Caput parvum, antice parum angustius, supra inter oculos vix impressum, margine antico in medio prominente. Antennæ subovales, parum angustiores, margine interno magis recto, basi constricto. Prothorax cordato-truncatus, angulis anticis rotundatis, latitudine majori longe ante medium posita; lateribus pone medium rectis et postice convergentibus, disco pone medium fossula parva ovale notato. Elytra conico-truncata, setosa, absque striola suturali. Abdomen postice magis dilatatum, in medio fortiter impressum, setis fulvis ad latera instructum. Pedes breves, crassi, tibiis omnibus basi angustatis, ad apicem longe setosis; 4 anticis intus prope apicem spinula minuta intus porrecta armatis.

SPECIES FROM SOUTH AMERICA.

Sp. 13. *Articerus Brasiliensis*, Westw. (Plate XVII. fig. 5.,

Obscure castaneus, punctatissimus; elytris crebrius punctatis; abdomine convexo nitido, tenue setoso, fasciculis duobus setarum ad basin instructo, capite oblongo; antennis subfiliformibus, prothorace brevi subconico-truncato, lateribus rotundatis, pedibus gracilibus.

Long. corp. lin. 1½.
Habitat in Brasilia, Nova Friburga.
In Mus. Melly.

E speciebus Australasiaticis antennis subcylindricis et forma et sculptura capitis et prothoracis distinctissimus. Caput elongato-oblongum, sulco longitudinali e margine antico ad medium verticis extenso punctisque duobus magnis pone oculos impressis. Partes oris determinare non potui, nullis earum vestigiis detectis. Antennæ capite longiores, graciles, subcylindricæ, extus paullo crassiores, setosæ, articulo basali rudimentali instructæ. Prothorax brevis, subconico-truncatus, lateribus subrotundatis, antice sensim convergentibus, disco punctatissimo punctisque duobus magnis ovalibus prope

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angulos posticos alteraque media ante scutellum posita impresso. Elytra subrotundata, postice truncata striola suturali, altera approximata discoidali postice abbreviata, tertiaque brevissima subhumerali. Abdomen elongato-ovale, glaberrimum, convexum, basi ad latera setosa lateribusque marginatis. Pedes graciles, simplices.

Genus METOPIAS, Gory.

This curious genus, first described by M. Gory in Guérin's Magasin de Zoologie for 1832, and represented in Plate 42, was founded upon a remarkable species, of which M. Lacordaire informs us (Gen. d. Coleopt. 2, p. 169), that he only took two specimens in Cayenne, flying in woods, and which, both in the anterior nose-like projection of the forehead and the elbowed antennæ presents so great analogy with the *Curculionidæ* that M. Gory designated the species—

(Sp. 14) *Metopias Curculionoides* (Plate XVII. fig. 6).

In consequence of its similarity to *Metopius* (the name of a genus of *Ichneumonidæ*), M. Laporte proposed to change the generic name to *Marnax*; but I quite agree with M. Lacordaire in rejecting such a proposed change, considering that it is a matter of indifference whether a genus or sub-genus, as at present constituted, in one order bears a name similar or even identical with that of another in a different order; although of course it is advisable to avoid such "*doubles emplois*." The genus belongs to that section of the family which has the antennæ approximated together at the base, forming by itself a distinct subsection from the unequal size of the two ungues in each foot. I have added an outline of this typical species in Plate XVII. fig. 6, in order to show its distinction from the two new species described below, from which it will be at once seen to differ in the cordiform shape of its prothorax.

We are indebted to the indefatigable exertions of Mr. Bates for these two additions to this remarkable group.

Sp. 15. *Metopias bellicosus*, Westw. (Plate XVII. fig. 7.)

Elongatus, capitis fronte longiori porrecto, prothorace versus angulos anticos, humerisque elytrorum bispinosis; pedibus longissimis, femoribus valde clavatis.

Long. corp. lin. 1⅓.

Habitat in Brasilia. D. Bates.

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Totus crebre punctatus, antennis et abdomine longe setosis. Caput subquadratum, vertice antice in nasum porrecto, apice parum dilatato antennasque gerente, spatio inter oculos antice tuberculis duobus latis ovalibus parum elevatis notato, punctisque duobus versus angulos posticos impresso. Palpi maxillares subgraciles, articulo ultimo paullo crassiori. Antennæ valde elongatæ setosæ, articulis tribus apicalibus crassioribus inæqualibus et irregulariter affixis. Oculi valde prominentes, hexagonis magnis et perpaucis. Prothorax subovalis, in medio longitudinaliter impressus, disco utrinque bi-inflato, et versus angulos anticos spinis duabus uncinatis armatus. Elytra semiovata, striola suturali altera discoidali, 3tia humerali et 4ta laterali, humerisque spina uncinata armatis. Abdomen oblongo-ovale, setosum. Pedes valde elongati, femoribus omnibus in medio clavatis, tibiis anticis depressis et in medio latioribus; tarsis biunguiculatis, unguibus magnitudine inæqualibus.

Sp. 16. *Metopias pacificus*, Westw. (Plate XVII. fig. 7.)

Brevis latior, capitis rostro porrecto breviori, prothorace et elytris inermibus, illo fere rotundato subgloboso, et rude punctato, pedibus sub-elongatis, femoribus haud clavatis.

Long. corp. 5—6 lin.

Habitat in Brasilia. D. Bates.

Species minuta, et e præcedentibus forma breviori et robustiori imprimis distincta. Caput brevius quam latum, inter oculos bitumidum, punctis duobus profundis versus angulos posticos, verticis parte porrecta breviori apice crassiori; palpi maxillares articulis crassioribus, ultimo ovali; antennæ longæ graciles, articulis tribus apicalibus irregularibus et præcedentibus crassioribus. Prothorax brevis, truncato-cordatus, fere rotundatus, convexus, rude punctatus; disco sulco medio profunde impresso; elytra latiora convexa punctata, setosa, striola suturali, discoque versus humeros impressioni ovali notato. Abdomen breve, crebre punctatum et setosum. Pedes satis elongati graciles, femoribus haud clavatis, tibiis anticis parum depressis.

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DESCRIPTION OF THE FIGURES.

PLATE XVI.

Fig. 1. *Bryaxis strigicollis.*
1*a*, maxillary palpus.

2. *Bryaxis quadriceps.*
2*a*, maxillary palpus; 2*b*, extremity of tibia and tarsus.

3. *Bryaxis atriventris.*
3*a*, maxillary palpus.

4. *Tyrus 4-spinosus.*
4*a*, mandible; 4*b*, maxilla and its palpus; 4*c*, instrumenta labialia; 4*d*, fore foot.

5. *Tyrus humeralis.*
5*a*, maxillary palpus; 5*b*, tarsus.

6. *Batrisus angulatus*, male.
6*a*, maxillary palpus.

7. *Batrisus angulatus*, female.
7*a*, mandible; 7*b*, maxilla with its palpus.

8. *Pselaphus Antipodum.*

9. *Pselaphus geminatus.*

PLATE XVII.

Fig. 1. *Articerus angusticollis.*
1*a*, antenna; 1*b*, middle tibia and tarsus.

2. *Articerus curvicornis.*
2*a*, antenna of male; 2*b*, ditto of female; 2*c*, anterior tibia; 2*d*, middle tibia.

3. *Articerus setipes.*
3*a*, antenna; 3*b*, fore foot; 3*c*, middle foot.

4. *Articerus dilaticornis.*
4*a*, middle tibia and tarsus.

5. *Articerus Brasiliensis.*

6. *Metopias Curculionoides*, with the tip of its antenna magnified more strongly.

7. *Metopias bellicosus.*
7*a*, tip of antenna; 7*b*, maxillary palpus; 7*c*, extremity of fore tibia and tarsus.

8. *Metopias pacificus.*
8*a*, extremity of antennæ; 8*b*, maxillary palpus.

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XXVII. *Characters of a few Australian* Lepidoptera, *collected by Mr. Thomas R. Oxley. By* Edward Newman, Esq., F.L.S., &c.

[Read 3rd December, 1855.]

The intelligence of the establishment of an Entomological Society and Museum at Melbourne, while it gives us assurance of the rapid advance and social progress of that infant colony, leads us to anticipate results in Natural History which the isolated labourers in this distant land could never hope to attain: at the same time it wafts to us across the world of waters a silent reproof of our own neglect of the entomological riches of a soil bound by every tie but that of proximity to our own. How few, how meagre, how scattered have been the attempts of Englishmen to make known the Entomology of Australia! the names of Lewin, Donovan, Kirby, MacLeay, Hope, Gray, Westwood, and a few others, may be noticed as those of Entomologists who have severally contributed their mite to our knowledge of the subject: on the continent Germar, Erichson and Boisduval have done more, and have done it more systematically; but even though we add the labours of our neighbours to our own, we shall still find that the insects of New Holland are, as a mass, unnamed and unarranged, even at the present day. These thoughts have arisen spontaneously while looking over a small collection made by Mr. Oxley, during a short residence in the province of Victoria; this he has obligingly placed in my hands, and I find that scarcely an insect it contains appears hitherto to have received—that first of all distinctions—a name. It is too late in life for me to attempt to supply the want which I deplore, but I beg to offer to the Society the characters of a few species of *Lepidoptera*, which I suppose to be new, thus adding my own mite to the contributions of the savans I have already enumerated.

It is interesting to find at the Antipodes forms among the *Lepidoptera* so nearly resembling those of our own country. This similarity is particularly striking amongst the *Micro-Lepidoptera;* the genera *Tortrix*, *Chimabacche*, *Tinea*, *Adela*, *Depressaria*, *Gelechia*, *Œcophora*, *Anesychnia*, *Glyphipteryx*, *Lithocolletis* and *Pterophorus*, so familiar at home, being unquestionably represented in our Australian colonies; and lead us to speculate on the characters of the country where such forms occur: thus *Tinea Ethellella* seems to assure us of the presence of Fungi; and the great preponderance

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of *Œcophoræ*, suggests the idea that the stems of the *Eucalypti* are well riddled by their wood-boring larvæ; while the brilliancy of *Adela Laurella* assures us of sunny days; and the gay *Œcophora Marionella* seems destined also for diurnal display. It is interesting, and at the same time indicative of the richness of the fauna, to observe, that almost every individual is distinct as a species; not merely separable by the tutored eye of science, but possessed of differences so strongly pronounced that the most careless observer could not fail to detect them; and this remark, as to distinctness of species, seems to apply equally to others, the worn condition of which renders it dangerous to describe them.

I have only to add that, although no precise habitats have been preserved, the entire collection was made at Forest Creek, Barker's Creek and Campbell's Creek, all on the Mount Alexander range, and at a distance of about eighty miles from Melbourne.

Class LEPIDOPTERA, Linn.

Stirps PHALÆNINA, Newman.*

Genus Zeuzera, Fabricius.

Sp. 1. *Zeuzera Duponchelii*, Newman.

Fœm.—Alis anticis fuscis, fasciis numerosis undatis nonnunquam anastomosantibus saturatioribus; posticis basi rubiginosis, apice fuscescentibus; capite thoraceque saturate fuscis; abdomine fuscescenti, basi rubiginoso. (Alarum dilat. 3·6 unc.)

Female.—Head and thorax dark brown; abdomen brown, ferruginous at base: fore wings dark brown, with numerous darker and nearly black markings, which, as in many species of *Zeuzera* and *Xyleutes*, are arranged transversely, waved, and frequently anastomose with each other; hind wings towards the apex of an obscure dingy brown, with the transverse waved markings faintly indicated, towards the base rust-coloured.

Mr. Oxley has brought home but a single specimen of this *Zeuzera*, which I have great pleasure in naming after one of the most distinguished of Lepidopterists. There are two species with which it may be advantageously compared: first, *Cossus lituratus* of Donovan and Boisduval, identical, as I imagine, with *Cossus nebulosus* of the same authors, and certainly the *Zeuzera liturata* and *Zeuzera nebulosa* of Mr. Walker's Catalogue of the Lepi-

* Equivalent to the typical *Phalenæ* of Linnæus, viz., *Phalæna Attacus* and *Phalæna Bombyx*.

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doptera Heterocera in the British Museum; and, secondly, with the *Eudoxyla Eucalypti* and *Eudoxyla Urvillii* of Boisduval, and Herrich-Schæffer, combined by Mr. Walker, loc. cit., under the name of *Zeuzera Eucalypti*. From both of these, however, it appears to me abundantly distinct. I am much indebted to Mr. Walker, who has so lately described the *Bombyces* in the Cabinet of the British Museum, for the kindness and care with which he has examined the six species of *Bombycidæ* here described as new: I should also add that I have adopted Mr. Walker's genera as recently described, and that Mr. Walker has obligingly decided the species named below severally to belong to the genera under which I have placed them.

Genus Teara, Walker.

Sp. 1. *Teara denticulata*, Newman.

Fœm.—Alis anticis fuscis, fasciâ basali undosâ, maculis discalibus duabus subrotundis, fasciis obliquis tribus, denticulatis, albidis; alis posticis albidis, fasciis tribus plus minusve denticulatis, ciliisque fuscis: subtus, alis anticis fuliginoso-fuscis, maculis discalibus duabus subrotundis, fasciisque duabus, unâ sesquialterâ pallidiori, obliquis, denticulatis albidis; posticis fuliginoso-fuscis, maculis discalibus duabus rotundis albis, fasciisque tribus (exteriori notabili) denticulatis albidis. (Alarum dilat. 2 unc.)

Female.—Head with palpi brown; eyes black; antennæ pale brown, with a white ring near the base; pronotum whitish; mesonotum covered with long loose brown hairs; abdomen brown, with scattered whitish scales; above, fore wings dark brown, adorned with the whitish markings described below; first, a short zigzag fascia at the base, next two nearly round spots, the smaller nearer the base, and both on a median line between the base and apex of wing, the larger and outer about midway, then an oblique indistinct fascia just exterior to the larger spot, and followed by a very distinct oblique fascia with its inner margin regularly scalloped, its outer margin nearly straight, and lastly, an equally distinct oblique fascia with both margins regularly scalloped; under wings greyish white, with three undulating fasciæ and the cilia brown; the first of the fasciæ is narrow and zigzag, the second is narrow and scalloped, the third is broad, its inner margin plain, its outer margin regularly scalloped: beneath, the same markings obtain as in the upper side, but more dilute and confused, and the hind wings have also two round white spots on the disk of the wing,

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both of them surrounded with a dark border; one of these spots is near the first of the fasciæ, the second, half way between this and the base; the legs and abdomen beneath are clothed with long loose smoke-coloured hair, there is a pure white spot at the apex of the femora and another at the apex of the tibiæ.

Mr. Oxley has brought but a single specimen of this; it is a beautifully marked although plainly coloured insect, and is entirely unlike any described species with which I am acquainted.

Sp. 2. *Teara Guenéi*, Newman. (Plate XVIII. fig. 9.)

Fœm.—Alis omnibus fuscis; utriusque maculis duabus albis, ciliis flavescentibus; antennis fuscis; capite sternoque fulvis; thorace fusco pilis longis obsito; abdominis segmentibus basalibus fulvis, apicalibus fuscis fulvo-marginatis, apice ipso fulvo. (Alarum dilat. 2 unc.)

Female.—Head and prothorax fulvous, antennæ about as long as the thorax, slender, slightly pectinated, brown; eyes small, brown; mesonotum brown, clothed with long spreading brown hairs; abdomen fulvous at the base, three segments near the apex nearly black, their margins fulvous, the penultimate segment brown, the last fulvous: wings on both sides of an uniform smoky brown, each with two conspicuous white spots and fulvous cilia; in the fore wing the larger white spot is a square with the angles rounded, it is placed about the centre, but nearer the costa than the anal angle, and nearer the apex than the base, between this and the base is a smaller rounder spot; in the hind wings the larger spot is drop-shaped, rather nearer the costal margin than the anal angle, the lesser spot is less clearly defined and exactly intermediate between the larger and the base of the wing.

This beautiful insect is dedicated to M. Guenée, as a slight tribute of my profound admiration of that prince of living Lepidopterists. The specimen is, I believe, at present unique, and I know of nothing at all resembling it in the distribution of colour.

Sp. 3. *Teara Edwardsii*, Newman. (Plate XVIII. fig. 10.)

Mas.—Alis anticis flavido-fulvis, aréâ basali ultra medium extensâ, et maculam pallidam includente, plumbeo-fulvâ; posticis fulvis concoloribus; cæteris fulvis, oculis abdomineque mediano nigris. (Alarum dilat. 1·5 unc.)

Male.—Antennæ about as long as the thorax, deeply and uniformly bipectinated from the base to the tip, the shaft fulvous, the ramuli tinged with brown; eyes very black; head and thorax

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fulvous, clothed with long loose hair; abdomen fulvous at the base, then with five segments dorsally black, the apex surrounded with a fringe of long spreading fulvous hair: above, fore wings fulvous, the apical area bright, the basal area extending beyond the middle, tinged with lead-colour and including a nearly white median spot, which is surrounded with bright fulvous; hind wings pale fulvous; underside uniformly pale fulvous.

This species is dedicated to Mr. Henry Edwards, now at Melbourne ardently studying the insects of Australia under their native sun. A single specimen only was taken, which seems abundantly distinct from anything previously described.

Genus Termessa, Walker.

Sp. 1. *Termessa Shepherdi*, Newman. (Plate XVIII. fig. 11.)

Mas et Fœm.—Alis anticis albidis, basi, fasciis duabus latis undatis, margineque quoad partem nigricantibus; posticis flavis, maculis duabus versus marginem sitis nigricantibus; maxillis luteis; labipalpis nigris; capite flavo; oculis antennisque (basi flavo excepto) nigris; pronoto et patagiis nigris; mesonoto albido; abdomine flavo. (Alarum dilat. 1·2 unc.)

Male and *Female.*—Maxillæ long, yellow; palpi entirely black; head bright yellow; eyes black; antennæ brown, yellow at the extreme base; pronotum and tippets black; mesonotum whitish or cream-coloured; fore wings also cream-coloured, with a small undulating black spot, or rather fascia, almost close to the base; beyond this are two broad clearly defined waved dark brown fasciæ, occupying nearly half of the wing; the first is situated rather before, the second rather beyond, the middle of the wing; the exterior margin, with the exception of the extreme apex and a portion near the anal angle, is also black; hind wings yellow, with two conspicuous black spots, the first near the apical angle, the second and larger half-way between this and the anal angle: beneath deep yellow, approaching to fulvous, the fore wings having a broad black fascia beyond the middle, and a large black costal blotch before the middle; the femora are yellow; the tibiæ and tarsi brownish.

This beautiful insect is one of the commonest species imported from the Australian continent; it does not, however, appear to have received a name. I cannot compare it with any familiar species, and I have much pleasure in dedicating it to Mr. Edwin Shepherd, one of our active and invaluable secretaries, more especially as it affords me the opportunity of acknowledging his obliging assistance while preparing these memoranda.

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Genus ŒNOSANDRA, Walker.

Sp. 1. *Œnosandra Boisduvalii*, Newman.

Mas et Fœm.—Alis anticis niveis, sericatis, costâ fuscâ, vittâ magnâ mediânâ nigrâ; posticis niveis, sericatis, nullo modo signatis; capite, prothoraceque albis; oculis antennisque fuscis; abdominis dorso nigro, fasciis sex læte flavis. (Alarum dilat. 2·25 unc.)

Male and Female.—Head white, with a frontal black spot; thorax white; antennæ brown; eyes black; fore wings satiny white, with a slender but very distinct brown costa, and a broad central black stripe, which extends from the apex to the base, and is adorned with a few scattered yellow scales; the hind wings are entirely white, with the same satin-like gloss; the abdomen is black above, with six bright yellow fasciæ; beneath, the wings are white and glossy, suffused with a smoky tinge, the costa of the fore wings delicately margined with brown; there is no trace of the black vitta, so conspicuous on their upper surface; the legs are smoke-coloured, each adorned with four snow-white spots; the sternum is clothed with long loose smoke-coloured hair; the abdomen black, palest at the tip.

A very common Australian insect, but apparently undescribed; I have named it in honour of Dr. Boisduval, whose works are indispensable to the student of *Lepidoptera*.

Stirps TINEINA, Newman.*

Genus TORTRIX, Fabricius.

Sp. 1. *Tortrix Ashworthana*, Newman.

Alis anticis isabellinis, fasciâ obliquâ e margine costali mediano angulum versus analem tendente, maculisque nonnullis minutis adhuc saturatioribus; posticis pallide fuscescentibus, nubeculis saturatioribus, ciliis pallidis transverse medio saturatioribus. (Alarum dilat. ·85 unc.)

Head, including the labial palpi and antennæ, pale testaceous; eyes dark brown; thorax concolorous with the head, but having a few darker spots; abdomen pale testaceous and silky; fore wings

* On mature reconsideration I revert to the group *Tineina*, as established by myself in 1834, in preference to adopting the more restricted group to which Mr. Stainton, twenty years subsequently, applied the same name: the *Tineina* of Newman comprises the whole of that group now generally understood as *Microlepidoptera*. The *Tortricina* of Stainton properly constitutes a division of

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isabelline-testaceous, with darker markings, indicated rather than pronounced; the first is basal, and consists of five or six brown points, arranged as an angulated fascia across the wing; the second is nearly central, rather broad, very oblique, its internal boundary clearly defined, its external boundary indistinct; it is of a clear ferrugino-testaceous brown, bounded internally by a few still darker spots; the hinder margin of the wing between this and the base is tinged with the same colour, the apical area of the wing has twelve or thirteen dark brown scattered spots; hind wings pale brown, immaculate; the cilia are pale and silky, with a darker central line extending throughout their length; each of the scales constituting the cilia, if examined separately, is found to be very pale at the base, much darker in the middle, and again paler at the apex; beneath the fore wings are testaceous, the costa paler, the central area deeper and more obscure, the whole sprinkled with darker spots, the hind wings pale testaceous, beautifully sprinkled with clearly-defined darker spots, most of which are elongated transversely.

Dedicated to Mr. Ashworth, one of our most indefatigable collectors of the British *Lepidoptera*, and the gentleman who has lately added *Agrotis Ashworthii* and *Trochilium Scholiæforme* to the British list. One specimen only was taken. I have great pleasure in acknowledging the valuable assistance I have received from Mr. Stainton, in preparing the description of this and the following *Tineina*; he has most obligingly examined every specimen, and agrees with me in believing them all to be hitherto undescribed.

Sp. 2. *Tortrix Standishana*, Newman.

Alis anticis sericatis, micantibus, pallide aureis, apice rufescentibus; posticis pallide fuscescentibus, ciliis concoloribus: subtus, alis anticis fuscis marginibus omnibus pallidis; posticis fuscescentibus concoloribus. (Alarum dilat. ·55—·625 unc.)

Fore wings shining, pale golden with a transverse oblique ill-defined ferruginous fascia near to and parallel with the oblique outer margin; hind wings pale brown, the cilia of the same

the *Tineina*, and not a corresponding group; and the *Tineina* of the same author seems to me scarcely a natural group, but divisible into several groups equivalent to his *Tortricina*. The *Crambidæ* also, on reconsideration, I believe were, at the same date, correctly combined with the *Pyralina*, a disposition of them at variance with every subsequent arrangement until that of Herrich-Schæffer, who combines them under the name of *Crambides*.

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colour; beneath, fore wings brown, with all the margins pale; hind wings paler brown, with the margins concolorous.

Dedicated to Mr. Joseph Standish, whose inimitable skill in colouring entomological plates gives them a reality of appearance, and consequently a value, which no other colourer has hitherto been able to achieve. Two specimens of this insect were procured.

Genus Chimabacche, Zeller.

Sp. 1. *Chimabacche Cinderella*, Newman. (Pl. XVIII. fig. 6.)

Alis omnibus cinereis concoloribus; anticis maculis parvis septem lunatis in crescenti dispositis ante marginem externum alteribusque discalibus elongatis satis distantibus fuliginosis; subtus, alis anticis fuliginosis, marginibus albidis posticis cinereis concoloribus. (Alarum dilat. 1·4 unc.)

Head, palpi, antennæ, thorax and fore wings ashy grey; eyes rather large and very black; the fore wings have a series of seven lunate blackish spots, ranged in the form of a crescent within the apical margin, exactly equidistant therefrom, and exterior to each of these on the margin itself is a black point, together forming a series parallel with the first; on the disk of the wing are several short black streaks or longitudinally lengthened spots, and in addition to these the entire surface of the wings are densely irrorated with minute black points; the hind wings are paler grey than the upper, have a silky gloss, and are entirely without markings, they are very ample; abdomen concolorous with the hind wings; beneath the fore wings are smoke-coloured, with paler margins; the hind wings are pale grey and unicolorous.

One only of this species was taken; it is in excellent condition, and affords the opportunity of stating that there is no known species nearly allied to it.

Genus Tinea, Zeller.

Sp. 1. *Tinea Ethelella*, Newman.

Alis anticis sericatis fuscis, lumine mutato nonnunquam auro-tinctis, nubeculis irroratis albidis, maculâ centrali conspicuâ albâ, margine postico late albido; posticis nitidis basi pallidis, apice fuliginosis; capite magno et cum thorace flavidis. (Alarum dilat. ·45—·65 unc.

Head large and densely covered with erect testaceous yellow scales; antennæ and eyes black; mesonotum testaceous yellow;

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patagia dark brown; fore wings brown, very silky, and when the insect is held in a certain position having a golden effulgence; their entire surface is sprinkled with paler markings; in the centre of the disk is a diaphanous spot, pale ochreous or almost white, and the inner margin of the wing throughout its entire length is testaceous yellow, forming, when the wings are closed, a conspicuous vitta down the back; the cilia are testaceous yellow; hind wings glossy light brown, rather paler at the base, the cilia also are paler; beneath, the wings are particularly silky and glittering, they are brown, with paler margins and cilia.

Three specimens were taken of this pretty *Tinea;* it forcibly reminds one of *Tinea ferruginella,* but is larger, and the cilia of the fore wings are yellow.

Genus Bondia, Newman.

Caput mediocre rotundatum, fronte lævigato. Antennæ setaceæ, valde pilosæ; labipalpi mediocres, articulo basali inviso, 2do incrassato, pyriformi, 3tio brevi, erecto, parvo, obtuso. Alæ anticæ vix latæ, fere lineares, angulo anali nullo modo producto, ciliis mediocribus; posticæ basi amplæ, apice acutæ, ante apicem paullulo emarginatæ.

I am not acquainted with any genus of *Tineadæ* with which this insect can well be associated, although the structure of the wings is somewhat as in *Gelechia,* the labial palpi preclude the idea of placing it in that genus. I venture, therefore, to propose a new genus for its reception, and this I have pleasure in dedicating to Mr. F. Bond, one of the most zealous and most accomplished of our Lepidopterists.

Sp. 1. *Bondia Nigella,* Newman.

Alis anticis nigris, vestigio mediano pallido literam C *formante signatis; posticis fere hyalinis, apicibus fuliginosis.* (Alarum dilat. ·675 unc.)

Head, palpi and antennæ black; fore wings black, with several tufts of raised black scales with a pale testaceous discal mark on each rather beyond the middle, and resembling the letter C, which faces the apex; the cilia are black, and at the anal angle rather long; the hind wings are nearly hyaline, the apices and cilia smoke-coloured; beneath the upper wings are dull lead-coloured, the cilia darker; hind wings rather paler, with the cilia concolorous.

There is but a single specimen, and this in many particulars, reminds one of *Gelechia Œthiops.*

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Genus Adela, Latreille.

Sp. 1. *Adela Laurella*, Newman.

Alis anticis cupreo-æneis læte ignitis, fasciâ latâ mediand nigrâ flavo-striatâ, pone medium lumine mutato læte chalybeis, ciliis nigris; posticis nigris, ciliis concoloribus. (Alarum dilat. ·5 unc.)

Base of antennæ, tippets and fore wings golden coppery, brilliantly metallic; the wings have a broad central fascia, the ground colour of which is black, but its hue modified by the number of pale yellow longitudinal striæ, with which it is half occupied, beyond this the hue of the scales is changeable with the altered position in which the insect is held, sometimes becoming of the most gorgeous metallic green; the cilia are quite black; hind wings, together with their cilia, entirely black.

The antennæ of this beautiful little insect, being broken off close to the base, it is impossible to say what characters they may have possessed. It is not closely allied to any described species, but has some slight resemblance to *Nematois fasciellus*. Only one example was taken.

Genus Anesychia, Stephens.

Sp. 1. *Anesychia Stella*, Newman. (Pl. XVIII. fig. 5.)

Alis anticis cineraceis costâ late nigricanti, strigâ latâ subcostali vix bene determinatâ, necnon maculis difformibus nigris interruptâ albidâ, spatio anteapicali intus acuminato plumbeo-nigricanti, maculis linearibus parvis octo in crescenti dispositis ante marginem externum nigris; posticis sericatis, cinereis concoloribus. (Alarum dilat. ·9—1 unc.)

Head, palpi, antennæ, thorax and abdomen grey; fore wings also grey, with the costa broadly black; beneath the black costa is a white vitta, originating at the base and extending to the costa near its apex; this white vitta is interrupted; first, by a black mark at its base; secondly, by an obliquely transverse fascia at about one-third of its length; thirdly, by a spot on its anterior, and, fourthly, by another on its posterior margin; the space between this white vitta and the inner margin of the wing is greyish white, almost concolorous with the vitta itself; the apical area of the wing is blackish grey, the darker hue preponderating towards the disk, and centrally produced into an acute angle, the lighter towards the

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margin, and interrupted, first, by a zigzag lunulate line, and secondly, by eight linear black spots, disposed in the form of a crescent, just within the apical margin; hind wings semi-diaphanous, ashy grey, with their cilia concolorous; beneath fore wings dark smoky grey; hind wings light silky grey.

A variable species; the two specimens taken are so different as to render the task of defining them rather dangerous. There is no described species with which to compare it.

Genus Depressaria, Haworth.

Sp. 1. *Depressaria Melesella*, Newman.

Alis omnibus latis apice rotundatis, pallide fuscescentibus, lumine mutato perpaullo iridescentibus, anticarum maculis 2 discalibus parvis nigricantibus. (Alarum dilat. ·825 unc.)

Labial palpi long, the apical joint long, slender and recurved; head, thorax and fore wings of a delicate drab colour, with a silken gloss, exhibiting in certain positions iridescent tints; just within the apical margin are a series of ten minute round brown dots, and there are two others rather more conspicuous on the disk of each wing, the first rather before, the second rather beyond the middle; hind wings slightly different in tint from the fore wings, rather more smoke-coloured but equally glossy; there is little difference in the colour of the under side.

A single specimen was taken. I cannot compare it with any known species, neither does it very readily associate with the genus in which I have placed it.

Sp. 2. *Depressaria Lewinella*, Newman.

Alis anticis latis cinereis, maculis minutis, difformibus, nigricantibus; posticis cinereo-fuscescentibus, ciliis concoloribus: subtus, alis anticis fuscescentibus; posticis perpaullo pallidioribus. (Alarum dilat. ·9 unc.)

Labial palpi longer than in any of our British species, the terminal joint very long, slender; colour of the head, thorax and fore wings grey; the last have a number of black marks, all of them longitudinally elongated; hind wings pale, smoky brown, glossy or satiny, with short pale concolorous cilia; underside of the fore wings smoky brown, of the hind-wings slightly paler.

This species also differs essentially from any species of *Depressaria* previously described. Two specimens were taken.

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Genus Boydia, Newman.

Caput mediocre rotundatum, fronte lævigato; antennæ elongatæ, setaceæ nullo modo ciliatæ: labipalpi mediocres, 3-articulati, articulo basali brevi scitè cyathiformi; 2do elongato, crasso, apice truncato; 3tio apicali gracili, brevi, nudo, peracuto, paullulùm recurvo: alæ anticæ elongatæ marginibus parallelis, disco longitudinaliter profundè unisulcato; posticæ amplæ, insecti quiescentis ultra anticos protrusæ, margine costali fimbriâ longissimâ venuste ornatis.

The very remarkable appearance of this insect, reposing with its hind wings protruding from beneath its fore wings, as in the familiar *Gastropacha Quercifolia*, and each furnished with a plume of delicate long hairs attached to its costal margin, at once distinguishes it from any other of the *Tineadæ* with which I am acquainted: the labial palpi also differ from those of any described genus, and the deep sulcus on the fore wings is a character of interest. I have dedicated the genus to Mr. Thomas Boyd, one of our most zealous and active Microlepidopterists. The genus will in all probability be found to be most nearly allied to our *Anchinia*.

Sp. 1. *Boydia criniferella*, Newman.

Alis anticis nigricantibus, albido-irroratis, strigâ basali latâ binisque medianis parvis albidis; posticis nigricantibus pilis plurimis longissimis fuliginosis margine antico ortis. (Alarum dilat. ·1 unc.)

Basal cup-shaped joint of labial palpi white, second joint white beneath nearly to the tip, which is tinged with brown, third or apical joint white at the base, black at the tip, head brown, eyes large and black; thorax and abdomen brown, the apex of the latter testaceous; fore wings brown, irrorated with white scales; on the basal disk is a vitta composed of white scales, which terminates rather before the middle of the wing; this is interrupted by a dark brown or nearly black blotch in the very centre of the wing, and beyond this are two short, white, parallel vittæ; hind wings testaceous brown, the costal margin tinged with ferruginous, the hairs constituting the plume attached to the costa are ferruginous at base, dusky brown at apex: beneath, body and legs whitish; wings dusky brown.

Three specimens of the insect are preserved: it is totally different from any species previously described.

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Genus Tortricopsis, Newman.

Caput rotundatum, fronte lævigato; antennæ corpore longiores, setaceæ, simplices, nullo modo armatæ; maxillæ elongatæ; labi-palpi majores, porrecti, apice recurvi, articulo basali inviso, 2do magno, deltoideo, angulo basali ad orem extenso, producto, porrecto, subacuto, apicali obtuso, articulum tertium erectum, paullulo recurvum, gracilem, elongatum emittente; alæ anticæ latæ, amplæ, basim versus arcuatæ, apice paullo falcatæ, margine externo fere quadrato; alæ posticæ latæ; cilia brevia.

This pretty insect in the form and size of its wings closely resembles a *Tortrix*, the short cilia also seem to indicate an approach to that family; but the labial palpi, which are fortunately very perfect, much more nearly approach those of *Upsolophus* and *Aplota*, nevertheless it differs from these in the smoothness and roundness of its head and forehead, and in outline the quiescent insect has exactly the bell-shaped figure of a true *Tortrix*.

Sp. 1. *Tortricopsis Rosabella*, Newman. (Pl. XVIII. fig. 8.)

Alis anticis ferrugineo-fuscis, maculâ mediocostali obliquâ saturate fuscâ, nebulâ vagâ prope marginem interiorem quoque fuscâ, margine externo ciliisque fuscis; posticis luteis margine ferrugineo-tincto, ciliis basi ferrugineis apice fuscis; abdomine pallido: subtus, alis anticis læte ferrugineis, margine ciliisque fuscis, margine postico quoque fuscescenti; posticis flavis, margine costali apice late margine postico tenuiter ferrugineis, radiis nigro-apicatis; coxis ventreque læte miniatis; femoribus tibiisque rufescentibus; tarsis fuscis. (Alarum dilat. ·95 unc.)

Maxillæ ferruginous; head, labial palpi and antennæ mouse-coloured; thorax ferruginous; fore wings ferruginous, with an oblique, somewhat ill-defined, brown mark near the middle of the costa, a suffused brown cloud near the middle of the inner margin, and the external margin and cilia also brown; hind wings yellow, with a ferruginous tinge along the margin; each individual scale of the fringe of the hind wings has the basal half ferruginous, the apical half brown, so that the cilia have two distinct colours, next the wing they are bright ferruginous, externally dingy brown: beneath, the fore wings are bright ferruginous, slightly dusky at the apex; the hind wings yellow, with the costal margin, a broad apical portion narrowed along the outer margin ferruginous; the

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apical area is irrorated with brown; the cilia of the wings are bright ferruginous towards the wing, brown externally; the coxæ and under side of the abdomen are bright red; the femora and tarsi ferruginous; the tarsi brown.

There is but a single specimen of this insect. There is no described species with which I can possibly compare it.

Genus Œcophora, Zeller.

Sp. 1. *Œcophora Marionella*, Newman. (Pl. XVIII. fig. 7.)

Alis anticis nigricantibus, utriusque maculis octo difformibus albis, posticis flavis, marginibus nigricantibus; capite, pronoto, metanotoque flavis, mesonoto nigricanti; abdomine nigricanti cingulis apiceque aurantiacis. (Alarum dilat. ·8—1 unc.)

Head and pronotum yellow; antennæ brown; labial palpi very long, the second joint yellow above, black beneath, the apical joint entirely black; mesonotum black; tippets black at the base, yellow at the apex; metanotum yellow; abdomen black, with golden bands and apex; fore wings black, with eight pure white markings; the first of these is elongate, situate on the costa at its base,—the second is discoidal, somewhat deltoid, and equidistant from the costa and inner margin,—the third is discoidal, situate almost in the middle of the wing as regards its length, but much nearer the costal than the inner margin, it is slightly the largest of the eight,—the fourth is below this, longitudinally lengthened and the smallest of the eight,—the fifth is discoidal, transversely lengthened and placed nearer the inner margin than the costa,—the sixth is also transversely lengthened and reaches from near the sixth obliquely to the costa,—the seventh is transversely long and narrow, it is below the sixth and touches the anal angle of the wing,—the eighth is on the basal portion of the cilia, lengthened transversely and situate at the apex of the wing; with the exception of this mark the cilia are brown; hind wings with the disk yellow, the margins broadly tinged with brown, the cilia paler: beneath, fore wings brown, with two oblique testaceous obscure costal markings, cilia pale; hind wings dull yellow, with a central marking, the extreme apex and the posterior margin brown, cilia pale.

Four specimens were taken. It is a beautiful and very conspicuous insect, and not nearly allied to any known species.

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Sp. 2. *Œcophora bimaculella.*

Alis anticis flavis, fasciâ mediânâ latâ ad marginem posticum dilatatâ, alterâ apicali, ciliisque fuscis; posticis fuscis concoloribus. (Alarum dilat. ·65—·9 unc.)

Tortrix bimaculana, Donovan, Insects of New Holland.

Several specimens were taken. I have redescribed it as affording a second instance of the extremely near approach made by the *Tineadæ* of New Holland to our true *Tortrices;* no one who sees this pretty insect could feel the least surprise that Donovan should describe it as a *Tortrix.*

Sp. 3. *Œcophora Isabella*, Newman. (Pl. XVIII. fig. 2.)

Alis anticis flavescentibus, costâ fasciisque obliquis duabus, externâ tenuiori, fuscescentibus, ciliis pallidis; posticis fuliginosis, concoloribus: subtus, alis omnibus fuliginosis, concoloribus. (Alarum dilat. ·8 unc.)

Head, labial palpi and thorax pale yellow; antennæ and abdomen dingy brown, the apex of the latter yellow; fore wings pale yellow, with the costa brown, the apical region of the wing is adorned with two transverse oblique fasciæ of a pale purplish brown colour; the specimens being evidently wasted it is difficult to define the colour with greater precision; the first of these fasciæ commences on the inner margin, somewhat within the anal angle and proceeds obliquely upwards to the costa, terminating near the apex of the wing; the second and smaller fascia is united with the first at its base, and follows the outer margin of the wing almost to its apex, leaving a slender marginal line of yellow, the cilia are concolorous with the disk of the wing; hind wings dusky brown, with concolorous cilia: beneath, all the wings are uniformly smoky brown, with concolorous cilia.

There is but a single specimen of this insect; it is referred with doubt to the genus *Œcophora* and has no resemblance whatever to any described species.

Sp. 4. *Œcophora Ellenella*, Newman. (Pl. XVIII. fig. 3.)

Alis anticis sericato-fuliginosis, ciliis concoloribus; posticis luteis, apice, margine postico, ciliisque fuscescentibus. (Alarum dilat. 1 unc.)

Head, palpi, antennæ, thorax and abdomen pale drab brown, with a satiny lustre which also pervades the entire upper surface

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of all the wings; fore wings uniformly brown, with concolorous cilia; hind wings with the disk yellow, the margin and cilia pale brown: beneath, the wings are of the same hues as above, but the yellow is less clearly defined and less intense in hue.

Only a single specimen taken; it has no resemblance to any known species.

Sp. 5. *Œcophora Arabella*, Newman. (Pl. XVIII. fig. 4.)

Alis anticis fulvis, strigâ ante costam alterâque ante marginem interiorem, fasciâ obliquâ intus pone medium curvatâ, ciliisque nigricantibus; alis posticis sericatis, fuliginosis, concoloribus. (Alarum dilat. ·85 unc.)

Head and prothorax dull yellow; palpi and antennæ brown; thorax brown, with yellow markings scarcely susceptible of precise definition until more perfect specimens are obtained; fore wings divided by an oblique brown fascia beyond the middle, the discal area between this and the base is bright yellow, with a conspicuous brown vitta just below the costa, and a second occupying the inner margin; beyond the fascia the wing is lead-coloured, the cilia concolorous; hind wings uniformly brown, with concolorous cilia: beneath brown, the yellow portion of the fore wings obscurely indicated.

A single specimen taken; it has no resemblance to any described species.

Sp. 6. *Œcophora Zitella*, Newman.

Alis anticis fulvis, costa basali nigricante, ciliis fuscescentibus; posticis fuscescentibus, concoloribus. (Alarum dilat. ·7—1 unc.)

Head and antennæ fulvous; maxillary palpi very long, fulvous above the second joint, brown beneath; thorax and abdomen tawny; fore wings golden fulvous, with a slender black line on the costa at the base, cilia brown; hind wings entirely smoky brown, with concolorous cilia: beneath, all the wings uniformly brown, very silky and glittering, the cilia slightly paler.

Evidently closely allied to our British *Œcophora fusco-aurella* of Haworth, which Mr. Stainton as well as the late Mr. Stephens regard as identical with *Tinea unitella* of Hübner. (See Ins. Brit. Tin. p. 161.) The antipodean insect now described is, however, much larger and paler, and in other respects abundantly distinct.

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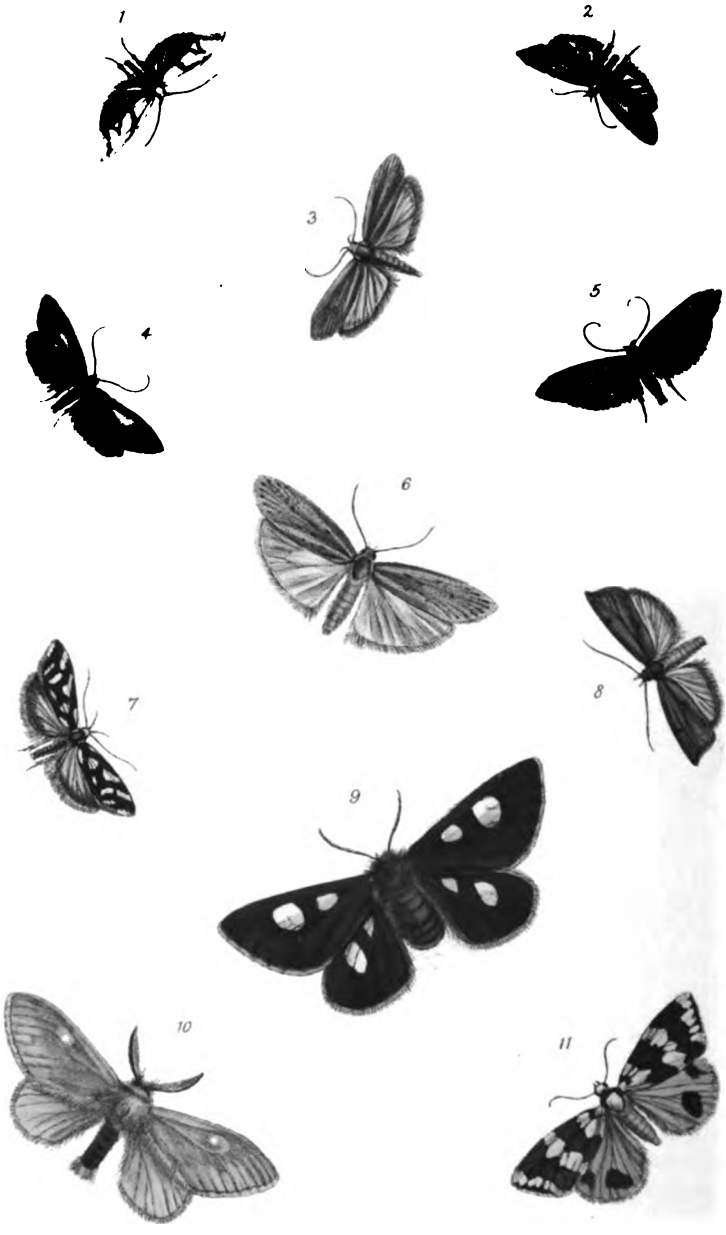

G. H. Pur.

W. West Imp.

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Sp. 7. *Œcophora Paulinella*, Newman. (Pl. XVIII. fig. 1.)

Alis anticis argenteis, sericatis, nitidissimis, fasciis duabus obliquis fuscis maculâque interveniente deltoideâ ad marginem interiorem sitâ centro niveo ornatâ quoque fuscâ; alis posticis fuscescentibus, concoloribus; insectum venustum! (Alarum dilat. ·7— 9 unc.)

Labial palpi long, the terminal joint particularly elongated, slender and cylindrical, greyish; head and incrassated base of antennæ white; shafts of antennæ, together with thorax and abdomen, dusky grey; fore wings silvery white, with certain markings which are nearly black; the first of these is an obliquely curved fascia which commences at about the middle of the inner margin and terminates on the costa beyond its middle; the second is a deltoid spot with a silvery centre seated on the inner margin; the third is an oblique fascia occupying the outer margin, almost a duplicate of the first; these three markings are united by the similarly coloured inner margin of the wing; the cilia are brown at the anal angle, thence to the apex white; hind wings smoky brown, with concolorous cilia; under side of the wings smoky brown, the cilia paler.

I am reluctant to propose a new genus for this insect, but I am perfectly aware that it differs essentially from *Œcophora* in many of its characters, more especially in having a distinctly falciform outer margin to the fore wings. It is widely different from any described species.

Sp. 8. *Œcophora Agnesella*, Newman.

Alis anticis albis, strigâ mediâ ante apicem vage divisâ testaceo-fuscâ; posticis albicantibus ciliis concoloribus: subtus, alis anticis fuscis; posticis albidis; ciliis omnibus albidis. (Alarum dilat. ·85 unc.)

Labial palpi long, slender and recurved, grey; head smooth, and together with thorax nearly white; antennæ whitish on the upper side towards the base, otherwise brown; abdomen whitish, each segment somewhat testaceous at the base, the apex bearing a tuft of whitish hairs; fore wings white, with a subcostal testaceous vitta extending from the base to about two-thirds the length of the wing, there dividing, and the two branches slightly

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divaricating, extend not only to the margin but to the extreme points of the cilia; hind wings white, without marks, the cilia, except as already indicated, white: beneath, fore wings brown; hind wings and all the cilia white.

One specimen only was taken; it is not nearly allied to any described species.

Sp. 9. *Œcophora Semelella*, Newman.

Alis anticis flavido-cinereis fasciis 3 nigricantibus, quarum basali rectâ, medianâ quoad costam divisâ ramulis divaricatis quoad marginem posticum integrâ literam V *fere fingenti, tertiâ difformi quoad marginem posticum latâ vix arcuatâ, quoad costam tenuissimâ costam ipsam vix attingenti, margine (alarum anticarum) externo quoque nigricante spatio medio pallido; posticis fuliginosis, ciliis concoloribus.* (Alarum dilat. ·55 unc.)

Head and labial palpi testaceous yellow; eyes and antennæ dark brown; pronotum yellow; tippets apparently dark brown; fore wings yellowish-grey, with various transverse dark brown marks; the first is a costal spot near the base, the second a straight but lobed fascia; following this are two narrow and abbreviated fasciæ, one rising from the costa, the other from the hind margin; these do not meet on the disk of the wing; beyond them, and occupying the centre of the wing is a V-shaped mark, that is, a fascia single and entire at the inner margin, but immediately divided into two widely separating branches which reach the costa; beyond this again is an amorphous fascia, its basal portion broad and somewhat lunate, its apical portion bent and much narrower does not reach the costa; finally a blotch of the same dark colour occupies the apical and another the anal angle; each of these gives off a slender limb toward the disk of the wing, almost enclosing a pale marginal space; underwings brown, with concolorous cilia: beneath, all the wings are dark brown, with concolorous cilia.

A single specimen of this insect was taken. Mr. Stainton thinks it has some resemblance to *Œcophora Borkhausenii*, but is abundantly distinct.

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Sp. 10. *Œcophora Hecatella*, Newman.

Alis anticis fuliginosis, maculâ basali mediocri, alterâ costali mediand deltoideâ, duabusque minutis discalibus nigris, alarum apice saturatiori vix nigricanti; alis posticis fuliginosis, ciliis concoloribus: subtus, alis omnibus saturate fuliginosis, concoloribus. Alarum dilat. ·75 unc.

Head, thorax and fore wings smoky lead-coloured; eyes, palpi and antennæ darker; there are several nearly black markings on the fore wings; the first occupies the entire breadth of the wing at its base, the second occupies the middle of the costa and is triangular, the third is also costal and apical, obscure and ill-defined; in addition to these are several black points, a series of which is parallel with the outer margin of the wing; the hind wings are smoky lead-coloured without markings, the cilia concolorous: underside somewhat darker than the upper and without markings.

A single specimen only was taken. It is very different from every described species.

Genus Glyphipteryx, Hübner.

Sp. 1. *Glyphipteryx Sabella*, Newman.

Alis anticis nigro-æneis, fasciis quatuor costalibus argenteis, maculisque duabus, deltoideis, costalibus apicem versus albidis, maculâque differmi argenteâ in angulum posticum; posticis fuliginosis concoloribus. (Alarum dilat. ·45 unc.)

Fore wings nigro-æneous, glittering, adorned posteriorly with yellowish scales and having four silvery white narrow fasciæ, which extend from the costa about half-way across the wing; beyond these and very near the apex of the wing are two deltoid white spots on the costa itself; from the inner margin of the wing arise other very similar but less distinct fasciæ, and these almost meet those on the costa; in the anal angle is a distinct silvery mark; the cilia are pale brown, with a nearly black mark at the apex: hind wings smoky brown, with concolorous cilia.

This pretty insect is evidently allied to our *Glyphipteryx Thrasonella*. Two specimens were taken, and these differ much in their marking; the silver markings descending from the costa are more perpendicular than in *G. Thrasonella*, and there is a black hook in the apical cilia of the fore wings, thus supplying an additional connecting link between *Thrasonella* and *equitella*.

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Genus Lithocolletis, Zeller.*

Sp. 1. *Lithocolletis Lalagella*, Newm.

Alis anticis niveis, fasciis quatuor (quarta semialtera) plumbeis marginibus propriis nigerrimis; posticis angustissimis fuliginosis, ciliis longissimis concoloribus. (Alarum dilat. ·4 unc.)

Head silvery white, with black eyes; fore wings snowy white, with four broad lead-coloured transverse markings, each of which has black margins; the first of these is basal, the second rather before, the third rather beyond the middle of the wing, the fourth is amorphous, it occupies the apex of the wing, and encloses a snowy white deltoid costal spot; the cilia are whitish, with a slight interruption of brown near the apex; the hind wings are very narrow and lined with long cilia attached to both margins; they are of a dingy white, inclining to silvery white along the middle.

In this pretty insect, of which a single specimen only was taken, the dark markings on a white ground immediately remind one of our *Lithocolletis hortella* and *sylvella*, but the simple transverse character of the second and third fasciæ at once distinguish the Australian from either of the British species.

Genus Pterophorus, Geoffroy.

Sp. 1. *Pterophorus tinctidactylus*, Newm.

Albus citreo-tinctus, lunula alarum pallide fusca anticarum, posticis dilute ochreo-cinereis. (Alarum dilat. ·65 unc.)

White with a very slight tinge of lemon colour; on the fore wings is an indistinct brown mark just at the base of the cleft; the hind wings are pale ochreous grey.

A single specimen only was taken; it a good deal resembles *P. osteodactylus*, but is readily distinguished by the paler colour of the posterior wings, and by the citron-yellow—not fuscous hue—of the antennæ. A second species of *Pterophorus* also forms part of the collection, but is so injured that I cannot venture to characterize it.

* As I understand the genus *Lithocolletis* of Zeller, it is not equivalent to the long previously characterized *Lithocolletis* of Hübner; it would, therefore, have been less confusing had Zeller given to his newly associated group an entirely new name: it is now too late, since the second *Lithocolletis* has become a classical, the first an obsolete, name.

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XXVIII. *Descriptions of Three Species of Indian* Micro-Lepidoptera. *By* H. T. Stainton, Esq.

[Read 7th January, 1856.]

The three insects I propose on the present occasion to describe, were bred last summer at Calcutta, by Mr. Atkinson. As it is something new to get bred specimens of the genera *Coriscium*, *Phyllocnistis* and *Lithocolletis* from the "far East," I hope this is but the beginning of an improved state of affairs.

Unfortunately, I am painfully aware of how very, very little use it is describing a few random species from a distant country; nay, I sometimes doubt whether this proceeding is not actually worse than useless, for the time will come when some one will have to go over these descriptions, to find whether other species from the same locality have previously been described or not; and it is more than probable that it will take him twice the time to make out my descriptions that it has taken me to make them.

It appears to me that each country ought to work out its own Entomology, and that while we amuse ourselves with describing a few American or Indian species, we only cause difficulties for future American or Indian Entomologists. Where, as in Entomology, the number of species is so vast, the description of a few only, from some distant quarter of the globe, unless systematically followed up, is likely to resemble the martello towers in "puzzling posterity."

Yet, doubting much whether I am doing right, I feel that some record of Mr. Atkinson's labours ought to be preserved, and, therefore, I have briefly sketched the following descriptions of the species he has sent me. I may add, that Mr. Atkinson is likely to remain at Calcutta some time, and proposes to continue his Micro-Lepidopterous studies there. The species I have now to describe are *Coriscium orientale*, *Phyllocnistis Citrella*, and *Lithocolletis Bauhiniæ*.

Coriscium orientale, n. sp.

Alis anticis griseis, dilute et saturate fusco-variegatis, strigulis tribus abbreviatis costæ apicem versus nigris, duabus albidis alternantibus; ciliis apicis albidis bis saturate fusco-cinctis.

Exp. al. 4½ lin.

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This insect is most nearly allied to our *Brongniardellum*, but the long tuft of the 2nd joint of the palpi (which tuft is quite as long as the terminal joint) would sufficiently distinguish it; and the markings on the anterior wings are very obscure and vague, and not bright and distinct as they are in our European species.

Expansion of the wings 4½ lines.

Head and face pale fuscous; maxillary palpi whitish; labial palpi, second joint, pale fuscous, varied with dark fuscous, with a long projecting tuft of moderate thickness; terminal joint whitish, with two black rings. Antennæ dark fuscous, with paler annulations. Hind legs ocherous; tarsi dark fuscous, annulated with whitish.

Anterior wings grey, irregularly mottled with paler and darker fuscous, with three more conspicuous blackish, oblique short streaks from the costa towards the apex, between which are two slender, oblique pale streaks; the posterior of which speedily assumes a blueish tinge, and is continued across the wing to the anal angle; cilia of the hinder margin whitish, intersected by two dark fuscous lines; cilia of the inner margin pale fuscous. Posterior wings fuscous, with a faint purple tinge, with paler cilia.

Mr. Atkinson sent me two specimens of this insect, with the following note: This is attached to one of the *Bauhiniæ*, but not *B. purpurea;* I suspect the larva feeds on the flower buds, but I have only seen it in pupa. The cocoon at first sight is very like the mine of some *Lithocolletides*, but on examination it is found to consist of an upper and under layer of fine compact silken web, of a delicate white, spread in an irregular oval patch on the upper surface of the leaf, and, like a *Lithocolletis* mine, slightly contracting it. It appears the beginning of June."

Phyllocnistis Citrella, Atkinson in litt.

Alis anticis albis, linea humerali, altera costali pone medium productis, maculam dilute auream includentibus, linea recta transversa fusca pone medium, apice dilute ochreo, puncto apicali atro.

Exp. al. 2¼ lin.

This pretty little insect is nearly allied to our European *Suffusella* and *Saligna*, though so much smaller. It is readily distinguished by the pale ochreous apical portion of the wing, and the straightness of the transverse fuscous line beyond the middle.

Expansion of the wings 2¼ lines.

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ead, face and palpi white. Antennæ whitish; basal joint e. Legs white.

nterior wings white, with two slender grey streaks; one from shoulder, terminating on the fold beyond the middle, the other inning on the costa, near the base, and running parallel to it; latter half of the space, included between these two streaks, is, certain lights, pale golden. In the middle is a short oblique eak from the costa; beyond the middle is a transverse dark scous line, beyond which the apical portion of the wing is almost ntirely pale ochreous, but with two short fuscous streaks from he costa, and some fuscous streaks at the anal angle; at the ipex is an intense black dot preceded by a few silvery scales, and from it three or four fuscous streaks radiate in the cilia. Posterior wings whitish, with pale grey cilia.

Of this species Mr. Atkinson only sent me two specimens, observing, "it feeds on a species of *Citrus*. The mine and cocoon are very like those of *Phyllocnistis saligna* and *suffusella*. The cocoon is situated at the edge of the leaf, which is rolled up by it, just as the willow and poplar leaves are by those species. I propose to call it *Ph. Citrella*. It appears in February."

Lithocolletis Bauhiniæ, Atkinson in litt.

Alis anticis brunneo-ochreis, linea tenui basali abbreviata albida infra et postice nigrosquamata, fasciis tenuibus duabus angulatis, tertia obliqua albidis, postice nigrosquamatis.

Exp. al. 2½ lin.

This is not closely allied to any of our European species. It has *some* resemblance to *Trifasciella* and *Scabiosella*, but is at once distinguished by the dark margins of the three fasciæ being on their *posterior* edges. Another singular instance of a marking diametrically opposite to those which occur in the European species of this genus, is, that the basal streak is dark margined on its *dorsal* edge.

Expansion of the wings 2½ lines.

Head dark ochreous, with a ferruginous tinge. Face and palpi whitish. Antennæ whitish, with fuscous annulations. Hind tarsi whitish, broadly annulated with dark fuscous.

Anterior wings brownish-ochreous, with a slender, short, whitish basal streak, margined beneath, and at its end with black. Before the middle is a slender, angulated, whitish fascia, much nearer the base on the inner margin than on the costa; the costal arm of this fascia is very short; beyond the middle is a second

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angulated fascia precisely similar; both these are margined with black scales externally, but only on the longer dorsal arm; towards the hinder margin is an oblique whitish fascia, terminating in the apex, externally margined with black, and between it and the second fascia, is a small whitish spot on the costa, which is sometimes connected with the angulation of the second fascia by a series of black scales; cilia greyish, with a dark fuscous hinder marginal line.

Posterior wings grey, with paler cilia.

Of this I have received several specimens from Mr. Atkinson, who remarks, "I detected this shortly after my arrival here, mining the upper cuticle of the leaves of *Banksia purpurea* (not *racemosa*, as formerly mentioned,*) in irregular circular or oval patches, the leaf remaining uncontracted. Before changing to pupa, the larva spins a slight silken cocoon, drawing together the two cuticles of the leaf in the centre of the mined part, and forming almost an exact circle."

* Proceedings Ent. Soc. vol. iii. N. S. p. 93.

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PROCEEDINGS

OF THE

ENTOMOLOGICAL SOCIETY OF LONDON,

1854.

February 6, 1854.

E. Newman, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Bulletin de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique,' Tome xx. Parts 1 and 2: 'Mémoires Couronnés,' Tome v. Part 2, Tome vi. Part 1: 'Instructions pour l'Observation des Phénomènes Périodiques': 'Mémoires de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique': all presented by the Academy. The 'Zoologist' for February; by the Editor. 'Monographie des Guêpes Sociales,' par H. de Saussure, Cahiers 1, 2, and 3; presented by the Author. The 'Athenæum' for January; by the Editor. The 'Literary Gazette' for January; by the Editor. The 'Journal of the Society of Arts' for January; by the Society. A box of British Lepidoptera, by P. H. Vaughan, Esq.

Nomination of Vice-Presidents.

The President nominated as Vice-Presidents for the year W. W. Saunders, Esq., F. Smith, Esq., and H. T. Stainton, Esq.

Prize Essay for 1854 *and* 1855.

It was announced that the Council, on behalf of the Society, renewed for this year the offer of a prize of £5 5*s*. for the best Essay on the Natural History of the Cocci injurious to British fruit-trees, especially of the "mussel-scale blight" of the apple, considering that the short notice given last year may not have allowed time for the preparation of such a paper. And the Council also now gave notice that they would award a similar prize for the best Essay on the Natural History of the Coccus which produces the lac-dye of commerce, which should be delivered to the Society on or before the 31st of December, 1855; and it was stated, as an encouragement, that

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Dr. Royle had kindly promised that the information at present possessed by the East India Company, or any other that the resources of that Company could procure from India on the subject, should be at the service of those who might be induced to take it up.

Election of Members.

The following gentlemen were balloted for and elected Members of the Society:—George Brownell, Esq., Shaw Street, Liverpool; John Maxwell Savage, Esq., 26, Gloucester Place, Portman Square; Francis P. Pascoe, Esq., F.L.S., Fern Lodge, Kensington; Jacob Birt, Esq., Sussex Gardens, Hyde Park: and J. R. S. Clifford, Esq., Pimlico, was elected a Subscriber.

Exhibitions.

Mr. E. L. Layard exhibited several large cases of Lepidoptera collected by him during a residence of several years in Ceylon; nearly all in fine condition, and including species of great beauty and rarity.

The President exhibited a perfect male and female, as well as the larva-case and a drawing of the larva of a Sackträger, found by Mr. Bates in the interior of Brazil; it was evidently a species of Saccophora, and he proposed to call the species Batesii: he was preparing a detailed account of this curious genus, to which he would again call the attention of the Society as soon as some illustrative drawings had been prepared.

Mr. Douglas exhibited a Phigalia pilosaria, taken at 11½ P.M., on the 21st of January, sitting on a gas-lamp, at Lee. This appearance, so very early in the season, was the more remarkable from the continued low temperature existing to within a few days previous. He remarked also, with reference to the hour of its capture, that he had always seen moths on the street-lamps to be more numerous after 10 o'clock at night. Since the late mild weather had set the grass growing, he had noticed young hybernated larvæ of Elachistæ mining in the newly formed leaves.

Mr. Stevens exhibited Argynnis Paphia, ♂, a variety in which the black spots on the upper surface of the wings, usually of a round form, were run together into oval patches; also Argynnis Euphrosyne, ♀, a variety with a black band across the centre of all the wings, giving it the appearance of a distinct species. Both specimens were captured by Mr. Johnson, near Ipswich. Mr. Stevens also exhibited specimens of Elater impressus, *Fab.*, a new British species, captured at Rannoch, in 1853, by Mr. Weaver and Mr. Foxcroft.

British Elateridæ.

Mr. Curtis read a paper entitled "Critical Remarks upon the British Elateridæ, with Descriptions of some of the Species."

New Work on the Genera of Coleoptera.

Mr. Waterhouse called the attention of the Meeting to a work about to be published in Paris, by subscription, entitled 'Genera des Coléoptères,' par M. Jacquelin du Val, with plates by M. Jules Migneaux. The whole work will be comprised in 86 parts, large 8vo., each of which will contain 3 plates of 5 coloured types, details of generic characters, and corresponding text, and the price 1½ franc.

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Species of Cherrus and Polyphrades.

Mr. Waterhouse stated that during last autumn he visited Oxford for the purpose of examining a portion of the Rev. Mr. Hope's collection, and that after that visit he communicated some observations which he had made relating to certain species of Curculionidæ (which were described by Schönherr, from specimens in the collection in question) to M. Jekel; amongst other points he noticed the very great resemblance which there existed between the type-specimens of Polyphrades cinereus and Cherrus nanus, which he thought ought not to be separated generically, and which could scarcely be even separated as distinct species. In return, M. Jekel favoured Mr. Waterhouse with some observations upon the species of Cherrus and Polyphrades, which he regards as of sufficient interest to be laid before the Society.

The following is M. Jekel's communication:—

"Genera Cherrus and Polyphrades.—This is a very interesting case, which, after many troublesome efforts, I ascertained about two years ago, in studying the new species of Germar—Cherrus nitidilabris, of the 'Fauna Novæ Adelaidiæ.' I do not know whether I spoke to you on the subject last summer, but I had been puzzled as you are now. My decision was as follows:—

"1. Schönherr described Cherrus nanus in vol. i., doubting, in a note, as to its being a true Cherrus, and at that time he knew only this species as belonging to the Cherriform beetles.

"2. In vol. v., when reviewing his genus Cherrus, he no longer had by him the Cherrus nanus, and when he there established his new genus Polyphrades, he did not sufficiently recollect the characters of that species, which, as I have said, he originally doubted as being a true Cherrus. He then described a large species of Polyphrades under the name cinereus, a species very closely allied to Cherrus nanus, but which may be distinguished by its having the suture cariniform behind, a character wanting in Cherrus nanus and C. nitidilabris. I possess, however, two other undescribed species with the same character.

"These species might be divided into two sections, which I am certain are not founded upon sexual characters, since I possess both sexes of some of them.

"1. Elytrorum sutura postice elevato-carinata; including Ch. cinereus, *Schönherr*, and two new species.

"2. Elytrorum sutura plana—Ch. nanus, *Schö.*, Ch. nitidilabris, *Germ.*, Ch. paganus, *Schö.* They all differ somewhat in the structure of the rostrum and antennæ from P. laticollis, P. argentarius, &c., but they scarcely should constitute a distinct genus."

March 6, 1854.

E. Newman, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for March; by the Editor. The 'Athenæum' for

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February; by the Editor. The 'Literary Gazette' for February; by the Editor. 'Journal of the Royal Agricultural Society of England,' Vol. xiv. part 2; by the Society. 'Revue et Magasin de Zoologie,' 1853, No. 9; by the Editor, M. Guérin Méneville. 'Proceedings of the Royal Society,' Vol. vi., No. 101; by the Society. 'Synopsis des Caloptérygiènes,' par M. Edm. de Selys-Longchamps: Bruxelles, 1853; by the Author. 'Journal of the Society of Arts' for February; by the Society.

Election of Members.

Charles Melly, Esq., Liverpool, was elected a Member; and S. C. Tress Beale, Esq., Ivy Court, Tenterden, was elected a Subscriber.

The Society's Excursions.

It was announced that the Society would make two excursions this year, one on the 10th of June, to Pembury, near Tunbridge, the other on the 8th of July, to Mickleham. Tickets for dinner, on either occasion, may be obtained by Members, for themselves or friends, of the Officers of the Society, at 2s. 6d. each, up to the 2nd of May; and after that day, at 3s. 6d. each.

Exhibitions.

Mr. Stevens exhibited specimens of the new British Zygæna Minos, taken last June, near Galway, by Mr. Henry Milner. He also exhibited some Coleoptera and Lepidoptera, just received from Mr. Fortune, in the North of China, several being remarkable from their great similarity to British species; and he also exhibited some Lepidoptera, including some Micros collected by Herr Guenzius at Port Natal.

Mr. Stevens exhibited the fine specimen of Morpho Cyperis, presented to the Society by Mr. T. J. Stevens, which had become saturated with grease, and was now quite restored by means of camphine and magnesia.

Mr. Moore exhibited a mud nest of a mason bee or wasp, containing several cells, in one of which he found a Chrysis, in another a wasp, and in a third part of a spider, all of which had probably entered after the builder of the nest had left it. The nest was found on a wall at Dacca, in India.

Mr. Curtis exhibited the following larvæ, which he intends to describe for a future meeting:—Larva of a Harpalus? of Stenolophus vaporariorum? Cistela (Prionychus) ater, Prostomis mandibularis, Helophorus? (alive at the end of two years), Pyralis (taken feeding on insects in a cabinet).

Mr. Foxcroft exhibited living specimens of Boletophagus crenatus, and the larvæ, also larvæ of a species of Tinea, probably pellionella, which had fed upon, and formed their cases of, hartshorn shavings.

Varieties of Lepidoptera taken near Ipswich.

Mr. Curtis, referring to the curious varieties of two species of Argynnis, captured near Ipswich, which were exhibited at the last meeting, said that that locality seemed prolific in curious varieties, for he had seen several of various Lepidoptera taken there. Mr. Desvignes also made a similar statement.

Capture of Hemerobius dipterus.

The President announced the capture by Mr. Dale, at Langport, in Dorsetshire, dipterus. This insect was previously known as German, but not as

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British, and adds still another to the interesting contributions made to British Entomology by this most indefatigable and successful collector. The species was first described from a German specimen, in Burmeister's 'Handbuch der Entomologie,' vol. iii. p. 973; and a second time by Mr. Walker, in the 'Catalogue of Neuropterous Insects in the British Museum,' part iii. p. 298.

Works on Zoology and Geology.

The President said that he had again been requested to state, that Sir William Jardine would be happy to receive any additions, from authors of works on Zoology and Geology, to the lists of their writings already sent in for publication by the Ray Society; the appearance of this bibliographical volume having been delayed by the untimely death of the lamented Mr. Strickland, to whom it had been entrusted.

Insects of Moreton Bay.

The President mentioned that he had received a communication from Mr. Rawnsley, offering to collect insects for the Society, or any of its Members, at Moreton Bay, in New South Wales.

Larva of Monodontomerus.

Read, a letter from G. Newport, Esq., F.R.S., &c., controverting at great length some of the statements of Mr. F. Smith respecting Monodontomerus, published in the 'Transactions' of the Linnean and this Society, and claiming the prior discovery of the larva.

Mr. Smith briefly replied that he had nothing to retract, and was content to abide by his former statements.

Phosphorescence of the Larva of an Insect.

The following paper was read: —

"Observations on the Phosphorescence of the Larva of an Insect." By J. Reinhardt. Read before the Association of Naturalists at Copenhagen, at the meeting on the 18th of February, 1853.*

"In April, 1852, on arriving towards the conclusion of my stay at Lagoa Santa, the larva of an insect, an inch and a half long, and emitting a strong light of a very peculiar kind, was brought to me, having been caught in a house just as it was creeping out from under a piece of timber lying in a passage. It had been seen the evening before, but had escaped before any one could muster up courage to lay hold of it. None of the inhabitants of the village to whom the animal was shown knew anything about it; though it cannot be of particularly rare occurrence in that part of Brazil, because I have heard, from an amateur of Zoology from Sabara, that he had met with it several times in that town.

"The peculiarity in its luminous property consists in its producing two distinct sorts of light; for while all the segments of the body, with the exception of the prothorax, are each furnished on the dorsal side with two shining points radiating a greenish light, like that which we see in our glow-worm and similar forms, the whole of the head,

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* Translated from the Danish by Dr. Wallich, F.R.S., V.P. Linn. Soc.

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excepting the eyes, antennæ. and the parts of the mouth, glows like a live coal, with the most vivid intensity, strikingly contrasting with the greenish luminous dots of the rest of the body. It is not, however, by the colour alone, and the locality of the light, that the animal becomes remarkable, and, so far as I know, unique among insects; but it appears moreover to be permanent: for, although it alternately diminishes in intensity, being at times scarcely observable by lamp-light, it is at other times quite distinct, nay, occasionally visible at mid-day; yet, during the whole of the twenty-four hours in which the insect continued alive with me, it never once lost its luminosity, and the decided alternations in the intensity were but little appreciable in the dark. Again, the greenish light of the segments contrasts with that which issues from the head, by fading and becoming perfectly imperceptible, and then again reviving, as is seen in the Lampyris; it frequently vanishes and becomes extinct in some of the segments, while in others it continues bright. It is rarely that the light is extinguished in all the segments simultaneously, and, on the whole, it is more nearly continuous than in the kind of insects just mentioned. The radiation takes place from the dorsal parts of the rings, behind and above the spiracles, without having apparently any absolute connexion with them, for it is seen also in segments wanting the spiracles, that is, in the mesothorax and last abdominal ring. The lucid points are of the size of the head of a small pin, and the light is so intense that it shines through the sides of the abdomen: when it ceases, no particular appearance is observable at the place whence it issued; and, unlike the luminous spots on the thorax of the shining Elaters, it is neither sharply defined, nor, in general, remarkable by any peculiar appearance; and on the larva being put into brandy, the red light was extinguished first, and then the green.

"I have in vain searched for any notice of such a larva in entomological works; neither is it mentioned in Ehrenberg's known memoir on the luminosity of the sea, prepared, no doubt, from the most extensive information upon all known phenomena of phosphorescence. I may therefore assume that the peculiar light in question has not hitherto been known to zoologists; although a short notice, giving the main features of the phenomenon quite correctly, but unaccompanied by any adequate account of the luminous animal itself, from the pen of F. Azara, appears in his 'Voyage dans l'Amérique Méridionale' (t. i. p. 114), wherein the author reports that at Paraguay he saw 'a worm of nearly two inches in length, the head of which glowed at night like a piece of burning coal, and having besides along the body, on each side, a row of holes resembling eyes, from which a fainter yellowish light emanated.' This accords, in all essential points, so entirely with what I observed myself, that I must consider the little discrepancy of the holes themselves being luminous, as depending simply on a less attentive examination; and I am therefore of opinion that there can scarcely be a doubt of the Paraguay worm being identical with, or at all events nearly allied to, that which I obtained at Minas.

"There cannot be a doubt of this larva being that of some Coleopterous insect, but of which it is impossible for me to say. It seems probable that the strong phosphorescence does not entirely cease with that stage, even although it should become more or less modified afterwards; and it may therefore be hoped that the property may lead to the discovery of the perfect insect. But although I have been collecting the Fauna of that part of the Brazils inhabited by this larva, through all seasons and on a somewhat large scale, yet have I never met there with any other luminous insects than Elateridæ and Lampyridæ. To the larvæ of the first of these families it has

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no resemblance; but it undoubtedly has several features in common with the latter, and on the whole it has a stronger affinity with these than with any other form of larva with which I am acquainted; and yet, as will be seen from the subjoined description, it differs from the larvæ of the three principal genera of the family in some essential points: so that it still remains a question whether the perfect insect will be found to belong to the Lampyridæ.

"*Description.*—My specimen was a little smaller than Azara's, and measured 40 millim. in length, and about 5 millim. in breadth. Body flattened in such a way that the dorsal side is slightly arched, and separated by a margin from the more flat abdominal side. Hairs are scattered all over the body, but more sparingly on the upper than on the under side, and especially towards the edge, where they stand so close together as to give that part a villous appearance. The colour above is a dirty reddish brown, below yellowish white. The head is horny, protruding somewhat horizontally, without admitting of being retracted and hidden by the first thoracic segment: there is a sharp fold around it, which gives the anterior part an appearance of extending from the hinder portion as from a sheath, and conceals the articulation of the lower parts of the mouth: on each side is one eye only, though rather large, placed inconsiderably before the fold just mentioned, and directed laterally and somewhat forward: before it are the palpi, which consist of four joints, the outermost being very short, and much thinner than the preceding ones. The structure of the mouth seems to indicate that the larva is of predaceous habits, which agrees also with the nocturnal life it appears to lead. The much-curved jaws are thick at their base, becoming rapidly attenuated towards their tips, without being terminated by a fine point; on their inner margin they bear only a small knob or obtuse tooth, and, when closed, they cross each other at the apex. There is an upper lip between the jaws, hardly large enough to fill the entire space between them, and therefore easily overlooked; its outer margin has a slight incision in the middle. The lower parts of the mouth, the jaws, and the under lip, are grown together with the extraordinarily developed basal joint, into a large plate, on which two deep furrows alone point out the limits of the lip and jaws: from the anterior margin of this plate, quite towards the sides, originate the maxillary palpi, which are cylindrical, short in comparison with their considerable thickness, and consist of four joints, the outermost being terminated by a slightly arched, cutaneous, and soft lamina, strongly contrasting with the other (brown) part by its whitish colour: close within these is the two-jointed maxillary lobe, almost concealed by the palpi, which are many times larger; and in the middle is seen what I think is properly the tongue, which is narrowest at its origin, widening towards the insertion of the two-jointed lingual palpi, and protruding between these with a little triangular elongation, bearing two brushes at its apex. There are twelve joints in the body, besides the horny anus, which protrudes like a thirteenth joint: they are hard and horny, except on the under side of the pectoral portion, and especially the metathorax, where the joints are partially soft and skin-like. The first thoracic segment is larger than the other two, and on its abdominal side is marked with a deep incision, like a V, in which almost the entire under side of the head is uncovered and visible, while, on its back, the head has its posterior part covered by the prothorax. The legs are long and strongly developed, whence the motions of the animal are proportionably rapid. The coxa tends obliquely inward and backward, and lies close to the body; it is cylindrical in form, rather long, and movably connected with the femur, which, although stouter, is not longer than the tibia: the foot consists of a single, long, very pointed, but slightly

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curved claw. Of the segments of the body, the first four are of nearly equal length, but are perceptibly shorter than the last five, and these again differ slightly amongst themselves: the abdominal portion of the first eight segments is divided into five parts by means of four furrows, of which parts the middle one is broadest, the two on each side narrower; or it may be thus stated:—The ventral portion of the body is covered, not as on the back, by one, but by five horny shields. The spiracles are nine in number on each side; the foremost on the under side of the mesothorax, close to the anterior margin of this segment; the remaining eight on the eight first segments of the abdomen, where they are situated on the dorsal shield, directly below the edge, where it bends towards the ventral side."

Bombyx Cynthia.

Mr. Spence communicated the following extract from the 'Journal of the Society of Arts,' February 24, 1854: —

"Col. Sir William Reid, Governor of Malta, has forwarded to the Society of Arts, through the Colonial Office, a communication in which he states, that after many failures, through the very laudable and persevering efforts of Mr. Piddington, of Calcutta, with the aid of the Directors of the Peninsular and Oriental Steam Packet Company, he has received some sound eggs of the Indian silkworm (*Bombyx Cynthia*), called by the natives of Assam 'Eria,' and which feeds on the leaves of the castor-oil plant. Of the eggs received about five hundred have hatched, and the worms, after undergoing two mutations, still appear to be in a very healthy state, feeding only on the castor-oil plant. Mr. Piddington had, for some time previously to Sir William Reid's arrival in Malta, been striving to convey this silkworm to the Agricultural Society of Turin, as they wish to introduce it into Italy; it will be his first duty, if he succeeds, to send it there."

Sir William Reid has also inclosed some copies of an account of the Assam silkworm, which have been published in the 'Journal of the Society of Arts of March 3rd. The following are extracts: —

"It is stated by Dr. Helfer that 'the Eria is reared over a large part of Hindostan, but more extensively in the districts of Dinagpur and Rangpur, in houses, in a domesticated state, and feeds chiefly on the leaves of Ricinus communis. The silk of this species has never been wound off, but people are obliged to spin it like cotton. It gives a cloth of seemingly loose coarse texture, but of incredible durability, the life of one person being seldom sufficient to wear out a garment made of it, so that the same piece descends from mother to daughter. It is so productive as to give sometimes twelve broods of spun silk in the course of a year. The worm grows rapidly, and offers no difficulty whatever for an extensive speculation.'

"'On account of the double profit that would be derived from the same area of land by cultivating it with the castor-oil plant, which produces oil and feeds the worm, an extensive cultivation of this species would be highly recommendable; and if, also, the cloth is of the coarsest nature, it is, on the other hand, very valuable on account of its durability. May it not be particularly well adapted to mix in certain textures with cotton?'

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"Dr. Helfer estimates that there are not less than a hundred and fifty species of moths in India [the larvæ of] which form cocoons more or less adapted for use in manufactures. He adds,—'Many have made the objection that the silk of the Indian species is much inferior. This is yet an undecided question. The mulberry silkworm degenerates if not properly attended to. What has been done to raise the indigenous species from the state of their natural inferiority? Very much depends upon the cultivation of the worms in houses; secondly, on the method of feeding them, selecting not that vegetable substance which best gratifies their taste, but that which contributes to form a fine cocoon; and, thirdly, from the first chemical operations employed before the working of the rough material. But even if the raw material would not be capable of a higher degree of cultivation, the demand for it would, notwithstanding, never cease in Europe. All the silk produced in Hindostan has hitherto found a ready and profitable market in Calcutta, and the demand is always greater than the supply.'"

April 3, 1854.

W. W. Saunders, Esq., Vice-President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for April; by the Editor. The 'Athenæum' for March; by the Editor. The 'Literary Gazette' for March; by the Editor. The 'Journal of the Society of Arts' for March; by the Society. 'Proceedings of the Royal Society,' Vol. vi., No. 100; by the Society. 'Revue et Magasin de Zoologie,' 1853, Nos. 11 & 12, 1854, Nos. 1 & 2; by the Editor, M. Guérin-Méneville. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1852, Nos. 2, 3, 4, 1853, Nos. 1, 2: by the Society. 'Hewitson's Exotic Butterflies,' Part 10; by W. W. Saunders, Esq. 'The Entomologist's Companion,' Second Edition, by H. T. Stainton: by the Author. A box of Lepidoptera from Bogota; by T. J. Stevens, Esq., Corr. M.E.S. Various Insects of Ceylon; by G. R. H. Thwaites, Esq., M.E.S.

Election of Members.

T. Tapping, Esq., 43, Gloucester Place, Kentish Town, and the Rev. D. F. Jarman, Manor House, Hadley, Herts, were elected Members of the Society.

Exhibitions.

Mr. Douglas exhibited Depressaria Capreolella, taken flying in the sunshine, on Sanderstead Downs, on the 12th of March; also a larva of Elachista Megerlella mining in the grass, Bromus asper.

The Rev. Joseph Greene sent for exhibition a specimen of Stauropus Fagi, ♀, bred from a larva taken at Halton, Bucks, and a specimen of the very rare Gluphisia crenata, reared from a larva found on a poplar near Halton, on the 18th of August. "The larva was about an inch in length, depressed, tapering somewhat at each end;

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the colour grass-green ; on the first segment a square brick-red spot, four more on the intermediate segments, and one also on the last. It formed a cocoon on the same day on which I found it. In reference to the early appearance of these insects, I should mention that they were kept in a green-house."

Mr. Baly exhibited a quantity of Hymenoptera, captured by Signor Botteri, in Dalmatia, comprising several species of Megachile, Nomada, Eucera, Anthophora, Anthidium, Ceratina, &c.

Mr. Stevens exhibited some insects recently captured by Mr. Bates, at Santarem, including twelve new Longicorn beetles ; and among the Lepidoptera several Erycinidæ, remarkable for the difference of colouring in the sexes, which had hitherto not only been taken to be distinct species, but had even been placed in different genera. Mr. Bates had informed him that he had discovered a character in the neuration of the wings of this family, which he intended to communicate to the Society at a future period. Mr. Stevens also exhibited two new insects, sent overland by Mr. Fortune, from China,—a Carabus, and the female of Dicranocephala Wallichii, being the second known specimen in Europe. He also exhibited some insects just received from Mr. Thwaites, in Ceylon, an Adolias and one of the Arctiidæ, with their very singular larvæ, the latter with foliaceous appendages.

Ants destructive to Cocci.

Mr. Spence communicated the following extract of a letter from G. R. H. Thwaites, Esq., F.L.S., Corr. M.E.S., dated Peradenia, Ceylon, February 9, 1854.

"A gentleman in this island has at length discovered a remedy for the bug which attacks the coffee-plant, but it seems rather uncertain at present whether the remedy be not really worse than the disease. Armies of red ants have been called in, and it appears that they make sad havoc amongst the young Cocci, but it is very certain that if the ants remain in any numbers upon the coffee-bushes, the Coolies would be unable to gather in the berries, for these said red ants bite most fiercely, and the natives have a great dread of getting amongst them. The ants seem to devour the young Cocci, but on opening their nests, I have found many of the larger full-grown Cocci, which I fancy they use as cows, like other ants, the smaller species of which are always attached to where the Coccus abounds, and feed on the exudation from them. If the ants can be induced to quit when the Coccus is destroyed, they will be a useful acquisition to the coffee-planter, but if they persist in remaining in the bushes, I do not know how pruning and gathering can be accomplished on the estate, but this will be ascertained by-and-bye. I question whether the ant would live on the higher estates, as it is only found at a moderate elevation. It is very abundant here, and makes its large nests in cinnamon and other trees, spinning together the leaves at the end of a bough, and woe be to him who breaks into their dwelling. A Cooly who has happened to do so in climbing a tree, comes down a great deal faster than he went up. Botany occupies so much of my time, that I am quite unable to devote particular attention to Entomology or any other branch of Zoology, and I often wish each day was double its length. This is such a fine field for a critical examination of tropical plants, and the field is so extensive, that I see no prospect of finding my work slacken in that direction. Mr. Edgar Layard, who is now in England, is our most enthusiastic zoologist, and I shall be glad when he returns to the island."

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Mr. Westwood doubted if the ants intentionally destroyed the Cocci, considering their death as the accidental result of the injuries sustained in consequence of the endeavours of the ants to procure their exudation.

Method of capturing Bolbocerus mobilicornis.

Mr. Douglas read the following translation of a note on a method of taking Bolbocerus mobilicornis, communicated by M. A. Rouget to Dr. Aubé, and by him to the Société Entomologique de France, and inserted in the 'Bulletin' of that Society for 1853, page 25.

"The locality where I take Bolbocerus mobilicornis is about three kilom. from Dijon, in the centre of corn-fields and natural and artificial meadows, rather lower than the surrounding country, which, however, itself is flat. This locality is very damp, and is on the border of a small stream, which is nearly dry in summer, but where, on the hottest and driest nights, the dew is very abundant; it is at the edge of a field of lucern near this stream that I place myself in ambuscade in order to capture my insect. I station myself upon a road which is rather lower than the field, and thus, by stooping a little, I have my western horizon just above the stems of the lucern; this circumstance is indispensable for success, for it is between 8 and 9 o'clock that I find the insect flying heavily over the lucern, and if it be not projected upon the sky, it is impossible to see it on account of the obscurity. I do not know if the lucern is indispensable to the insect, and as the neighbouring fields have not the same elevation above the road, I have not been able to prove the matter; possibly the question might be resolved by means of a lantern, but not having tried the method, I do not know if it would succeed.

"To ensure a successful result it is necessary, independently of the condition of horizon, but for the same reason, to have a sky without clouds, and an atmosphere very hot and calm, without which the insect does not fly; when the weather is favourable, I take in half an hour four or five specimens of Bolbocerus mobilicornis, but more females than males. I have remarked that those taken at the end of May are the yellow and brown varieties, which are only insects incompletely developed, those which I have taken in June and July are all black on the upper surface.

"I do not know any method of capturing the Bolbocerus in the day-time; there ought to be one, for the insect is then in the ground, as I have observed that living insects which I had brought home, and which remained all day buried in the earth at the bottom of a pot containing about four inches of it, every night came out, but in the morning I found they had gone in again; each day making fresh holes. M. le Major d'Aumont has told me he has often taken Bolbocerus mobilicornis near Lyon, on the banks of the Rhone, by digging into the holes made by these insects; he has also taken Bolbocerus Gallicus, near Marseilles, in the same manner. For my part, I have not noticed the holes of Bolbocerus mobilicornis in the locality where I take the insect, probably because the soil is not sufficiently damp and clayey to preserve their form; I have not observed any such holes as those made by them in captivity, but I think that with a little patience I might discover them."

Mr. Curtis remarked that many years ago he saw a number of these beetles flying at dusk over a heath near Norwich.

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Mr. Stevens said he once caught one flying in a room at the Bull Inn, Birch Wood, attracted, he thought, by a light burning therein.

The following memoirs were read:—

New Species of Saccophora, &c.

"Description of a New Species of Saccophora, found in the valley of the Amazon by Mr. Bates, and proposed to be named in honour of him, Saccophora Batesii." By Edward Newman, Esq., F.L.S., &c., President. This paper contained a reference to the only other known species of the genus described by Dr. Harris, under the name of Melsheimeri, and critical observations on both species, the larvæ of which, in their sack-like coverings and general habit, so much resemble the Psychidæ, while in their perfect state they appear to belong to the true Bombycidæ.

Mr. Westwood thought that these insects well showed that because the larvæ of different species resembled each other in form and habit, the perfect insects were not necessarily of the same genus or family; for here was an insect whose larva was a case-bearer, like the Psychidæ, yet the imago was winged in both sexes, the female especially (and this sex was always more normal than the male), showing an alliance to Odonestis; and further, he considered that M. Bruand and other French entomologists were in error, in associating Talæporia and such case-bearing Tineæ with the Psychidæ.

"Descriptions of some New Species of Lucanidæ, taken in the North of China, by Mr. R. Fortune:" by W. W. Saunders, Esq., F.L.S., &c.

"Descriptions of the Larvæ of some Coleopterous Insects:" by John Curtis, Esq., F.L.S., &c.

All these papers were illustrated by drawings of the several subjects.

A new part of the 'Transactions,' completing Vol. ii., New Series, was announced as ready.

May 1, 1854.

H. T. Stainton, Esq., Vice-President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for May; by the Editor. The 'Athenæum' for April; by the Editor. The 'Literary Gazette' for April; by the Editor. The 'Journal of the Society of Arts' for April; by the Editor. The 'Proceedings of the Royal Society,' Vol. vii. No. 1; by the Society. The 'Proceedings of the Literary and Philosophical Society of Liverpool,' No. vii.; by the Society. 'Revue et Magasin de Zoologie,' 1854, No. 5; by the Editor, M. Guérin-Méneville. 'Genera des Coléoptères d'Europe,' par MM. Du Val et Migneaux, pties. 1 et 2; by the Authors.

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Election of Members.

W. C. Dale, Esq., St. Pancras Vicarage, was elected a Member, and Messrs. Wallace and Bates were elected Corresponding Members of the Society.

Technical Trade Museum.

It was announced that the Council had resolved that the co-operation and aid of the Society should be given to the "Technical Trade Museum," now forming by the Society of Arts, under the direction of Mr. Solly; and that any duplicate specimens in the Society's collection, of insects beneficial or injurious to man, should be presented to it.

Exhibitions.

The Rev. Joseph Greene sent for exhibition a specimen of the rare Notodonta Cucullina, bred from a larva found on maple, and N. trepida, also reared; both larvæ having been taken at Halton, Bucks, last year.

Mr. Edwin Shepherd exhibited a pair of Aleucis pictaria, bred by a collector, who had no recollection of the larvæ.

Mr. Bond exhibited two bred specimens of Anticlea Berberata, of which the upper wings differed from each other in marking.

Mr. Douglas exhibited larvæ of Elachista cerusella, mining leaves of reeds, and larvæ of a new species of Elachista in leaves of Poa aquatica. These two kinds of larvæ are much alike; their manner of mining is somewhat similar, although in different plants; they had been considered to belong to one species (Zool. 4142), but the pupæ and perfect insects showed they were quite distinct; and Mr. D. proposed to call the new species E. Poæ.

Mr. Stevens exhibited a fine Notodonta dictæoides, and a pair of N. Carmelita, taken *in coitu*, the female of which was still laying eggs. These insects were captured on the 29th ult. at Shirwood Forest, where Mr. S. also took, under the bark of birch, Hylecætus dermestoides, larva, pupa, and imago; the larvæ he observed making transverse galleries in the alburnum. He also exhibited Elater rufipennis, E. balteatus, E. crocatus, E. sanguineus, Ips 4-punctatus, &c., from the same locality.

Mr. Stainton exhibited some shoots of ash, in which larvæ of Prays Curtisellus were burrowing beneath the bark; and stated that these larvæ when young, last October, had mined the leaves of the ash: a figure, by Mr. Wing, of the young mining larva, was also exhibited. Mr. S. observed that Guenée had said of this insect,—"Species incertæ sedis, donec larva latebit;" but he doubted whether the discovery of the larva and its singular habits would tend to remove this uncertainty, as no other larvæ were known to have a similar economy.

Mr. Stainton also exhibited some young shoots of the spindle-tree, which, as they grew, drooped in consequence of a minute larva feeding on the pith; these larvæ, however, soon leave the shoots, and spinning a few leaves together, feed thereon, thus almost reversing the order of things which takes place with Prays Curtisellus. He was at present unable to say to what species these larvæ belonged, but he strongly suspected they would produce Hyponomeuta plumbellus.

Mr. Stainton also exhibited a new Lithocolletis larva, discovered in Scotland by Mr. Scott, in the under side of the leaves of the bear-berry (*Arctostaphylos Uva-ursi?*),

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which was especially interesting, as being another instance of the larvæ of this genus feeding on a low-growing plant.

Insects at Tunbridge Wells and Dover.

Mr. Curtis read the following list of insects found at Tunbridge Wells and Dover in 1852: —

"Rhamphidia longirostris, *Wied.*, July 6, two females on the borders of a pond in a copse; I could not find the male. The species has not been taken in England before, but it has occurred in Ireland, where also, in company with Mr. Haliday, on the damp and shady rocks on the shores of the Shannon, I took Geranomyia unicolor.

Thalycra sericea, *Sturm* (Strongylus fervidus, *Oliv.*), July 14, off sallows.

Mylæchus brunneus, *Lat.*, July 23.

Quedius rufitarsis, *Mars.*, August 2, on parsnip-flowers, Dover.

Latridius nodifer, *Westw.*, July 3, off a hedge.

Malachius marginellus, *Fab.*, July 30, by Ziczac, Dover.

Miarus Campanulæ, *Linn.*, July 14, in flowers of Campanula rotundifolia.

Coccinella ocellata, *Linn.*, July 21, under fir-trees, Eridge Park."

Entomologists treated as Trespassers.

The Secretary read a newspaper account of the committal to prison for trial of two poor working entomologists on a charge of setting fire to the furze on Putney Heath. It did not appear from the report that there was any proof that the act was committed by the men, and, as they justly stated, the fire would destroy the insects they sought. A conversation then arose respecting the difficulty experienced by collectors of insects arising from the illiberality of landed proprietors, and their encroachments upon the public right of way, of which some instances were adduced; and it was suggested, whether the Society might not in some degree mitigate the annoyance, by giving its Members a certificate that they were such, and that into woods and such-like places they went only in pursuit of insects.

Field-study of the Tineina.

Mr. Stainton laid on the table an invitation to such persons as wished to study the Natural History of the Tineina in the field, to meet at his house every Wednesday evening during the summer, and make an excursion in the neighbourhood.

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June 5, 1854.

W. Wilson Saunders, Esq., Vice-President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for June; by the Editor. The 'Athenæum' for May; by the Editor. The 'Literary Gazette' for May; by the Editor. The 'Journal of the Society of Arts' for May; by the Society. 'Entomologische Zeitung,' January to April; by the Entomological Society of Stettin. 'Revue et Magasin de Zoologie,' 1854, No. 4; by the Editor, M. Guérin-Méneville. 'Proceedings of the Royal Society, Vol. vi. No. 102, Vol. vii. No. 3; by the Society. 'Zeitung für Zoologie, Zootomie und Palæozologie,' heraus-gegeben von Dr. E. D'Alton and Dr. H. Burmeister; 1848, 2 Quartal. 'Bemerkungen über den allgemeinen Bau und die Geschlechtsuntershied bei den Arten der Gattung Scolia, *Fabr.*' von Dr. H. Burmeister; both presented by Dr. Burmeister. 'Proceedings of the Berwickshire Naturalists' Club' for 1853; by the Club. A box of British Micro-Lepidoptera; by Mr. Douglas. Two boxes of insects collected in Burmah, and presented by Captain Hamilton, M.E.S.: this collection contains several very rare and new insects, including a new Goliath beetle, which Mr. Westwood described under the name of Narycius Hamiltonii, and seven specimens of a wasp which M. de Saussure has just described from the single example hitherto seen in Europe, now in the British Museum: the Society passed a special vote of thanks for this valuable donation.

The Society's Excursion.

The Chairman announced, that in consequence of the opening of the Crystal Palace having been fixed for the 10th instant, the excursion of this Society, which was appointed for that day, would not take place; but the Council recommended an excursion to Darenth Wood on the 17th inst. instead.

Exhibitions.

The Secretary exhibited some very beautiful drawings, by Mrs. Hamilton, of the transformations of Indian insects, which that lady had forwarded for the use of the Society.

Mr. Smith exhibited several Hymenoptera, taken by Mr. Foxcroft, in Scotland, including Osmia parietina, of which he found a nest under a stone; a new species of Andrena; and two specimens of an Andrena which agree in every respect with some in the British Museum received from Nova Scotia, which he had placed doubtfully as dark varieties of A. Clerckella.

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Mr. Janson exhibited some Coleoptera, sent from Scotland by Mr. Foxcroft, mentioning especially Elater (Diacanthus) impressus, E. lythropterus, *Germar.*, Pogonocherus fasciculatus, Sericosomus brunneus, S. fugax and Dictyopterus Aurora. He likewise exhibited a larva of Aplecta tincta with two excrescences, resembling Clavariæ, proceeding from the head, and which the captor states were green when the larva was alive.

Mr. Stevens exhibited a moth (Leucania?) found covered with a fungoid film; a fly, found impaled on a point of dry grass; two living larvæ of Notodonta Carmelita, part of the brood hatched from the eggs laid by the female exhibited at the last Meeting; and a specimen of the scarce Incurvaria tenuicornis, taken flying at Wickham Wood, in May.

Mr. Douglas exhibited Drilus flavescens, taken on flowers near Darenth Wood, June 1st; and seven species of Elachistæ reared from the larvæ, including the new one from Poa aquatica, for which he had proposed the name of E. Poæ.

Mr. Westwood exhibited some cocoons of the "Eria" silk forwarded from Malta by Dr. Templeton, with a request that he might be informed if any method was known by which the silk could be unwound from these cocoons, in which the silk was agglutinated into a solid mass, and hoping, if such a method was not known, some attention would be given to the subject, as, if this difficulty were overcome, there was no doubt this silk would become extensively used.

The Chairman said that very recently a gentleman, residing near Geneva, had asked his aid to procure some Indian silk cocoons, such as were exhibited by the East India Company at the Great Exhibition of 1851, in order to carry on some experiments of unwinding hard cocoons, in which he had hitherto been successful; and now that, by the extension of the cultivation of this valuable silk by its introduction into Malta (Proceed. 8), the supply would be increased, it was highly desirable that the difficulties of drawing off the threads should be conquered, and he trusted his correspondent would be successful with this kind also.

Mr. Boyd exhibited specimens of Elachista Treitschkiella, reared from the curious larvæ destitute of true legs, some of which were exhibited by Mr. Douglas at the Meeting of this Society in September last (Proceed. 127).

Goliath Beetles.

Mr. Westwood read a Memoir on Goliath beetles, describing several new species, and others of which one sex only was hitherto known.

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July 3, 1854.

Edward Newman, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for July; by the Editor. The 'Athenæum' for June; by the Editor. The 'Literary Gazette' for June; by the Editor. The 'Journal of the Society of Arts' for June; by the Society. 'The Natural History Review,' No. 2; by the Editor. 'Monographia Cassididarum,' auctore C. H. Boheman, Holmiæ, 1854; by the Author. 'Hewitson's Exotic Butterflies,' Part 11; by W. W. Saunders, Esq. 'Bibliotheca Historico-Naturalis,' 3 Jahrgang, 1 Heft, 1853; by the Author, Ernst A. Zuchold. Fifty specimens of British Lepidoptera; by T. H. Allis, Esq.

Exhibitions.

Mr. Stevens exhibited a living full-grown larva of Notodonta Carmelita, reared from the egg; a specimen of Pyrochroa pectinicornis, a new British beetle, taken by Mr. Buxton, in Scotland; and Damaster Blaptoides, *Koll.*, from Japan, of which only four specimens were known in Europe.

Mr. Waring exhibited several insects, found dead and covered with a tough film, apparently of a fungoid nature.

Mr. Janson exhibited a box of Lepidoptera and Coleoptera, captured by Mr. Foxcroft, in Scotland; also Drilus flavescens and other insects, taken on the occasion of the Society's excursion to Darenth Wood, on the 17th of June, when the Members present had the pleasure of the company of Herr C. A. Dohrn, President of the Entomological Society of Stettin, and Professor C. H. Boheman, Conservator of the Entomological Museum at Stockholm. He also exhibited six specimens of the scarce Hypulus quercinus, taken on the 8th and 10th of June, at Colney Hatch Wood.

Mr. Stainton exhibited specimens of the new British Anthrocera Minos, taken near Galway, by A. G. More, Esq., by whom they were sent for distribution among the Members.

Mr. Douglas exhibited a new species of Lithocolletis, bred from leaves of Vaccinium Vitis-Idæa sent from Scotland by Mr. Weaver; also Parasia Metzneriella, the larva of which fed in the receptacle of a flower-head of Centaurea nigra.

Mr. Smith exhibited Nomada armata, *Smith*, a bee hitherto exceedingly rare, but which Mr. Dossetor found to be common at Cline Wood, near Swansea, in company with Andrena Hattorfiana. He also exhibited a male of Tenthredo cingulata, this sex being rare, although the female is common in many places; and a new British Crabro,—both taken by Mr. Dossetor, at the above locality.

Carabus intricatus.

Mr. Waterhouse stated that a clergyman, the Rev. Mr. Hore, had lately informed

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him that he had, at different times, taken in the neighbourhood of Plymouth four specimens of Carabus intricatus, — a species which had been looked upon as a doubtful native.

Nepticula quadrimaculella.

Mr. Stainton called attention to a paper, by Professor Boheman, on Entomological discoveries made during a tour in the South of Sweden, in 1851, published in the Transactions of the Stockholm Academy, containing descriptions of many new species of all Orders, and, among them, a description of the insect taken by Mr. Boyd in the New Forest, and exhibited at the August meeting of this Society last year, which Mr. Stainton thought was Trichopterous, but which Prof. Boheman had, without any remark, placed among the Lepidoptera, under the name of Nepticula 4-maculella.

Nature of the Materials of Wasps' Nests.

Mr. Ingpen said that a microscopic examination of the material of wasps' nests rendered it doubtful if it were made of woody fibre, as was generally believed, for, viewed under a high power, it appeared to be composed of fungoid matter.

Mr. Mark, of Bogota, present as a visitor, said that in South America the wasps collected wood for their nests.

The President stated that Professor Quekett had made a microscopical examination of an anomalous mass taken by Mr. Bree from a rail cut out of the solid wood of an oak, and had pronounced it to be not wood, but fungus.

Genus Amycturus, &c.

Mr. Waterhouse read a paper entitled "Notes on the Genus Amycturus and allied Genera of Coleoptera, with Descriptions of some new Species."

New Species of Paussus.

Mr. Westwood read descriptions of four new Paussi, viz. P. pacificus from Ceylon, P. De Geerii, P. Afzelii, and P. Bohemanii, all from Caffraria; the first communicated for description by Herr Dohrn, the others by Professor Boheman. He also read "Notes on various Insects," by Mr. W. Varney.

New Part of the 'Transactions.'

Part 1, Vol. iii., new series of the 'Transactions,' was on the table.

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August 7, 1854.

H. T. Stainton, Esq., Vice-President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors: — 'Annales de la Société Entomologique de France,' 2me Série, tome x. 1852, and 3me Série, tome i. 1853; by the Society. 'Mémoires de la Société de Physique et d'Histoire Naturelle de Genève,' tome xiii. 2me partie; by the Society. 'Journal of the Royal Agricultural Society of England,' vol. xv. part 1; by the Society. 'Monographie des Guêpes Sociales,' cahier 6; by the Author, M. H. de Saussure. 'Revue et Magasin de Zoologie,' 1853, No. 10, and 1854, Nos. 5 and 6; by the Editor, M. Guérin-Méneville. The 'Athenæum' for July; by the Editor. The 'Literary Gazette' for July; by the Editor. The 'Journal of the Society of Arts' for July; by the Society. The 'Zoologist' for August; by the Editor. 'Entomologische Zeitung,' for May and June; by the Entomological Society of Stettin. 'A List of the British Tineina, for interchange among collectors and for labels;' by the Author, H. T. Stainton, Esq. Specimens of Anthrocera Minos for distribution among the Members; by A. G. More, Esq.

Election of a Member.

J. R. Turner, Esq., Manchester, was elected a Subscriber.

Exhibitions.

Mr. Boyd exhibited Limacodes Asellus, ♂ and ♀, recently taken in the New Forest.

Mr. Ingpen exhibited a box of Australian Diptera and Hymenoptera, chiefly from the vicinity of Adelaide. He also exhibited an exotic wasps' nest, but by what species made he was not aware, which he had examined microscopically, and found to be wholly composed of fungoid matter. He thought it probable that the nests of some of our native species were not made altogether of wood, as is generally believed, and in corroboration of this idea exhibited a piece of decayed wood from one of the cedars in the Botanic Garden at Chelsea, in which was a layer of fungus, and wasps, he said, were observed to frequent this tree for building materials.

Mr. Curtis said he had often seen wasps scraping off and carrying away particles from wooden palings where there certainly was no fungus.

Mr. Wing said he had recently seen wasps carrying away the pile from the leaves of a species of mullein.

Mr. Stevens exhibited a drawing of a variety of a larva of Acherontia Atropos made by a gentleman, who thought it might be a distinct species, but the imago reared from it (which was also exhibited) proved to be only a very slight variety; and Mr. Westwood, referring to Fuessly's 'Archives,' showed that the same variation from the ordinary colour of the larva was there figured.

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Mr. Stevens also exhibited the very rare species of Curculionidæ, Trachodes bispidus; this single specimen having been taken by Mr. Plant, of Leicester, by sweeping under oaks in a wood near that place.

Mr. Boddy exhibited a living specimen of the rare Ludius ferrugineus, of which the larva was found in a rotten ash tree near London, on the 3rd of September, 1853, and the beetle appeared on the 9th of July last. He also exhibited a living larva of the same species, respecting which Mr. Westwood observed the last segment of the body had not the least denticulation, thus affording a good character for generic distinction.

Mr. Douglas exhibited a series of specimens of Grapholita nisella, *Linn.*, bred from catkins of sallow and poplar, including all the varieties Pavonana, Bœberana, cuspidana, rhombifasciana and cinerana, which had been placed together by Mr. H. Doubleday, and might now be deemed without doubt to be but one species.

Notes on Irish Sphæriæ.

Mr. A. R. Hogan, of Dublin, sent the following communication respecting two examples of a Sphæria, accompanied by the specimens referred to.

"The Lepidopterous larva bearing the Sphæriæ now laid before the Society was taken by me on the 10th of March, 1853, while digging for pupæ at the roots of an oak tree in Mount Merrion, a demesne belonging to the Right Hon. Sidney Herbert, and not far distant from the place where I live. The Sphæriæ were at the time quite young, the tallest not being more than a quarter of an inch in height; and the species appeared to be the same as that on a former occasion (5th July, 1852), exhibited at a meeting of the Entomological Society, with no apparent difference but that of the shoots being somewhat stronger and thicker. The following entry appears in my note-book, made on the 12th of April:—'On examining the larva taken last month, which by Professor Harvey's advice has been kept moist in a jam-pot filled with clay and moss, and covered with a piece of glass, I found fully a dozen fresh sprouts on it, pure white, and one of them about the height of a line, shaped like the point of a dagger. From that time the Sphæriæ continued to grow, some more and some less rapidly, for several months, always retaining the white point at the end of each stem, generally covered with small drops of moisture, till at length the cold of winter seemed to deaden, though it did not destroy, their vitality. Meantime none of the shoots showed any sign of fructification, without which Professor Harvey said that it would be impossible to identify the species. In autumn I tried the experiment of placing a dead larva of Pygæra Bucephala and one or two other species in the same pot where the Sphæriæ were growing, in order to see whether any of the seed might be communicated to these larvæ from the moss (as in the first instance I met with evidently was the case), but without the desired effect.

"As early spring opened the Sphæriæ again threw out fresh shoots, some of the latter forming branches from the old ones whose extremities had withered away: this will be seen by an examination of the specimen, and it will also be remarked that there is a great diversity in the relative size of the shoots, one or two of them being so fine and delicate as hardly to be perceptible at first sight. At this stage of their growth, however, the space in which they were confined being manifestly too small, and seeming to cramp their existence, I could not resist the temptation (though from the great

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delicacy of the plants I knew it would be attended with risk) of transferring the whole into a larger vessel, where they might enjoy more space, more light and more air; but this experiment proved fatal, from what special cause I know not, and the entire nursery died away by slow degrees.

"I should previously have stated that the other example of Sphæria now exhibited, that of the chrysalis, was found at the foot of on old hawthorn tree at Roebuck, on the 27th of January of this year,—that the large shoot was then about an inch long, which length was soon trebled,—and that it came to its end in the same way and along with its brethren.

"In putting together these notes I have merely detailed the facts that fell under my own observation, and seem to come within the sphere of entomologists; the investigation of the plants and of their origin I leave to the botanist: yet, in conclusion, I may mention that as far as I can learn there has not hitherto been recorded any instance in Ireland similar to the one just described: the Rev. Joseph Greene indeed informs me that he saw a specimen at Powerscourt, but, as he did not preserve it, no further light can from this circumstance be brought to bear on the subject."

This kind of parasitism of vegetable upon animal bodies being rare, especially in Europe, it is to be hoped that Mr. Hogan may succeed in finding other specimens and rearing them to maturity.

Species of Trochilium and Cynips reared from American Oak-galls.

Mr. Westwood stated that from some galls of Quercus palustris received from North America, and deposited in the Museum in the Botanic Gardens at Kew, several specimens of a species of Trochilium had emerged, two of which he now exhibited. The larvæ had doubtless fed in the galls, although such a proceeding was quite abnormal to the genus, their excrement being visible near the apertures where the pupa-cases were left projecting. He could not find that the species had been noticed by Dr. Harris, in his 'Monograph on the American Sphingidæ,' and he had therefore described the insect in the 'Gardener's Chronicle,' under the name of T. Gallivorum. Among the galls he also found specimens of the Cynips causing the formation, which he had described under the name of C. palliceps. The following are the descriptions referred to:—

"*Trochilium Gallivorum.*—Measures 8 lines in the expanse of the fore wings and 5 lines in the length of the body. It is of a blue-black colour, with two slender, pale yellow diverging lines on the sides of the thorax above, and with the edges of the tail also pale yellow; the wings are transparent, except the dark fore margin, a curved bar across the middle, and a pale brown apical border; the legs are yellow, with a dark ring round the tibiæ near the tips."

"*Cynips palliceps.*—Of a black colour, with the head and front and under parts of the thorax pale yellow; the males are distinguished by the large size of their heads. Length rather less than 2 lines."

Economy of Evania.

Mr. Westwood said a connection between Blatta and Evania had often been noticed without the nature of it having been understood: he had recently had an opportunity of investigating the subject, a correspondent having sent him some egg-capsules

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of an exotic species of Blatta imported with Orchidaceous plants, and he had found Evania appendigaster, in the several states of larva, pupa and imago, within these capsules.

Captures by Mr. Curtis.

Mr. Curtis said that when on a visit recently to Mr. Dale, at Glanvilles Wootton, he had taken the following insects:—Myrmica graminicola, ♀ only; Ephyra orbicularia, June 10th, a fine ♂; Crambus uliginosus, June 15th to July 1st; Limnobia 6-guttata, *Hal.*, June 15th to July 1st; Acentropus Garnonsii, June 15th to July 1st. Concerning the latter insect he should make a communication at a future Meeting. At Clifton he saw Mr. Walcott's beautiful collection of bees, from which he exhibited two captured with the wings in a rudimentary state. At Mr. Vaughan's, at Bristol, he noticed the method of capturing small moths in glass tubes, invented by Mr. Brown, of Burton-on-Trent, and exhibited a sample.

Singular Beetle found in South-American Ants' Nests.

Mr. Westwood read a notice, accompanied by drawings of dissections, of a very curious beetle found by Mr. Bates in ants' nests, in the Valley of the Amazon, possessing the characters of several families, and so anomalous that it was very difficult to indicate its nearest relationship; and he further remarked that it was very singular that all the many Coleopterous insects found in ants' nests should have some peculiarity of form or structure. He described the present species under the name of Gnostus Formicicola.

New British Hemerobii, &c.

Mr. Curtis read a paper on two new British species of Hemerobius, with remarks upon the synonymy of Coniopteryx, &c.

September 4, 1854.

Edward Newman, Esq., President, in the chair.

In the absence of the Secretaries, the Chairman appointed Mr. S. J. Wilkinson to act as Secretary for the evening.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Papers and Proceedings of the Royal Society of Van Diemen's Land,' Vol. ii., Part 2; by the Society. 'Fabricia Entomologica,' par H. Jekel, Part 1; by the Author. A paper entitled "On some Arctic Species of Calanidæ," by John Lubbock, Esq., F.Z.S. (from the 'Annals and Magazine of Natural History'); by the

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Author. 'Proceedings of the Royal Society,' Vol. vii., No. 5; by the Society. 'Journal of the Society of Arts' for August; by the Society. The 'Literary Gazette' for August; by the Editor. The 'Athenæum' for August; by the Editor. 'Resumen de las Actas de la Academia Real de Ciencias de Madrid, en el Ano Academico, de 1847 a 1848;' Idem, 1848 a 1849; 'Estatutos de la Academia Real de Ciencias;' all by the Royal Academy of Sciences of Madrid. The 'Zoologist' for September; by the Editor. 'Insecta Maderensia; being an Account of the Insects of the Islands of the Madeira Group,' by T. Vernon Wollaston, M.A., F.L.S.; by the Author. 'Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin im Monat Juni, 1853,' by Dr. Schaum; 'Hemiptera and Orthoptera from Mozambique,' forming part of the work of Dr. Peters on that country, by Dr. Schaum; both presented by the Author.

Old Series of the Society's 'Transactions.'

It was announced to the Meeting that, by a resolution of the Council, at the end of the present year the stock of the old series of the Society's 'Transactions' would be made up into volumes; and this notice was given that the Members might avail themselves of the interval to complete their sets.

Trade Museum of the Society of Arts.

It was also announced that the Council had resolved to present to the "Trade Museum" now forming by the Society of Arts such duplicate specimens of insects as could be spared from the Society's collection, especially of those which are injurious or beneficial to man, and a certain selection had been made; but in order to make the gift as comprehensive as possible, the Council requested the co-operation of the Members, by their giving such further specimens from their own collections as they may think proper.

Exhibitions.

Mr. S. Stevens, on the part of Mr. Evans, of Darley Abbey, exhibited a specimen of a new British Noctua, of which several had recently been taken in North Wales. According to Herrich-Schäffer's figure and description, it appears to be the Spælotis Valesiaca, *And. & Boisd.*, but it does not agree with Freyer's figure of the species.

Mr. Stevens also exhibited six specimens of Agrotis lunigera, likewise examples of Spælotis cataleuca, taken recently at the Isle of Wight. He also brought for exhibition a box of insects collected in the neighbourhood of Singapore by Mr. Wallace, which contained many new and interesting species both in Lepidoptera and Coleoptera: among the latter, the Longicorns were very beautiful, and bore much the larger proportion compared with the other families.

Mr. Bond brought for exhibition specimens of Acidalia degeneraria from the Isle of Portland; Orthosia hyperborea from Perthshire, observing that this species had hitherto been unique in the cabinet of Mr. Douglas; Noctua tenebrosa, also from Perthshire; and a specimen of Acosmetia caliginosa from the New Forest.

Mr. Edward Sheppard exhibited a box of Coleopterous insects, captured in the New Forest at the end of July and beginning of August, containing Phloiotrya rufipes, Platypus cylindricus, Elater sanguineus, Triplax ænea, Mycetocharus scapularis, [illegible] maficollis, and many others.

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Mr. Hudson exhibited a hermaphrodite Polyommatus Alexis, remarkable for having the right wings ♀ and the left ♂, contrary to what usually occurs in such cases.

Mr. F. Smith exhibited specimens of Myrmica cespitum, ♂, ♀ and workers, only the ♀ and workers being hitherto known; Myrmica flavidula; a new species; and both the sexes of the true Bombus soroensis, taken from the nest. All these specimens were captured by him at Shoebury, near Southend.

Mr. S. Stevens, on the part of Mr. Oxley, exhibited a collection of insects, chiefly Coleoptera and Lepidoptera, made by him in South Australia: it contained many interesting species, and among the Lepidoptera were some fine examples of the families Tortricina and Tineina, and some cases of a large species of Psyche, composed apparently of pieces of a rush about an inch long, placed longitudinally and firmly cemented together.

Mr. Curtis exhibited specimens of the curious Acentropus Garnonsii from Glanville's Wootton, including the apterous female; also a large mass of white and very elongated eggs, supposed by Mr. Curtis to have been laid by the specimen exhibited, as they were found near her. Mr. Curtis presented two males for the Society's cabinet.

Damage to White Mustard-Crops by Insects.

Mr. Westwood read the following letter relative to a species of beetle (*Phædon Betulæ*) which had done great mischief to the mustard-crops near Ely:—

"Ely, August 29, 1854.

"Sir,

"The enclosed beetles are now ravaging the white mustard-crops in the Fens near Ely. They are so numerous that hundreds of thousands might be collected in a few minutes by shaking the stems over a newspaper. Having devoured the leaves, they then bark the stems and the seed-vessels (provincially called "coshes"). The effect of walking through the field where they are is very singular: as soon as the stem is jarred down they fall, and the noise so produced is like the rattling of shot or hail all around you. The crops appear to have approached maturity before they commenced their attack, otherwise they must have been wholly destroyed. As it is, the stems and seed-pods are stripped, and the seed becomes lean and of inferior quality. I have not heard the folks say they remember such a visitation before, although I apprehend the insect is a very common one.

"Mixed with the larger insects was the common turnip beetle, in the proportion of about 1 in 100. I observed that the brown mustard (*Sinapis nigra*), scattered as a weed throughout the crop, was also eaten in the same manner; but another cruciferous plant, the Erysimum cheiranthoides (which by the way is a very common garden and corn weed about Ely), was untouched. Will you kindly state what the insect is, and if it has been known to do the like before?

"Yours, &c.,
"W. Marshall."

Acarus on Hay.

Mr. Westwood then read the following letter:—

"Villiarstown, Cappoquin.

"Sir,

"Enclosed are some insects taken from the base of a newly made rick: they lie in a band of about 4 inches thick by 9 inches wide. The hay was off a reclaimed

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bog, after oats. There is also another rick close by, which is affected the same way. When first they appeared they were removed at once, but in one or two days after the rick was as bad as ever. I shall feel much obliged if you will let me know what they are, what should be done to the hay to get rid of them, and also whether it is bad for horses to be fed on such hay.

"I am, Sir, yours truly,
"A. E. Nicholl."

Mr. Westwood exhibited a drawing of this Acarus, observing it was very similar to the common cheese-mite.

Habitat of a Chelifer.

Mr. Westwood exhibited specimens of a Chelifer, which had been found in great numbers on the plants and fruits in melon-frames. Messrs. Walker and Curtis had likewise observed them frequently in such places, and both thought they fed upon minute insects.

Materials of Wasps' Nests.

The Secretary read the following letter from Mr. W. H. Watkeys, relative to wasps' nests, and specimens of the material alluded to were exhibited.

"Stroud, July 27.

"Sir,

"Seeing, in the report given in the 'Gardener's Chronicle' of your meeting, that a discussion arose as to whether wasps use the scrapings of solid wood in the construction of their nests, allow me to give an account of a little personal observation on the subject. I have several times observed wasps on and near beds of the dried stalks of stinging-nettles and similar substances, but till last Saturday I had not proof that they were used in the construction of their nests: I was passing near a hedge in which were numbers of these stalks, and about ten or a dozen wasps were hard at work biting off nearly all the outside of the dried nettles, and, the nest being near, I watched their coming to and fro, which I think was evident proof of the fact maintained by your Society.

"I am, Sir, yours &c.,
"W. H. Watkeys."

Mr. F. Smith observed that wasps sometimes do use solid wood in the construction of their nests, for he once had a nest of Vespa Norvegica for some months in his room, the wasps going constantly to and fro, during which period he noticed them frequently scraping and gnawing the outsides of his store-boxes, which are of deal, for building material. His room being a very dry one, he is confident it was the wood they used and not fungus, which could not have been found in such a place under such circumstances.

Beetles in Seeds of the Brazilian Wax Palm.

The following letter, from Geo. F. Wilson, Esq., was read:—

"Price's Patent Candle Company, Belmont, Vauxhall, London,
"August 22, 1854.

"Sir,

"A short time back a friend brought us, from Ceara, some seeds of the Copernicia Cerifera,—the wax palm of the Brazils, which yields the Carnahuba wax.

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While looking at the seeds yesterday, I perceived three live beetles among them. As the seeds are probably the first that have come to this country, the beetles may possibly be rare.

"Your obedient servant,

"Geo. F. Wilson.

"The Secretary of the Entomological Society."

Some of the seeds and the beetles above alluded to were exhibited: the latter proved to be Caryoborus Bactris, of the family Bruchidæ.

October 2, 1854.

Edward Newman, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Mémoires Couronnés et Mémoires des Savants Etrangers,' tome xxv.; 'Bulletins de l'Académie Royale des Sciences et des Beaux Arts de Belgique,' tome xx. 3me partie, tome xxi. 1re partie; 'Annexe aux Bulletins,' 1853—1854; 'Annuaire de l'Académie Royale des Sciences, des Lettres et des Beaux Arts de Belgique,' 1854; all presented by the Academy. Zuchold's 'Bibliotheca Historico-Naturalis, Vierter Jahrgang, 1 Heft. January to June, 1854; by the Author. Guérin's 'Revue et Magasin de Zoologie,' 1854, No. 8; by the Editor. 'Proceedings of the Royal Society,' vol. vii. No. 6; by the Society. The 'Literary Gazette' for September; by the Editor. The 'Athenæum' for September; by the Editor. The 'Journal of the Society of Arts' for September; by the Society. The 'Zoologist' for October; by the Editor. 'Annales des Sciences Physiques et Naturelles d'Agriculture et d'Industrie,' tomes iv. and v.; by la Société Impériale d'Agriculture &c. de Lyon. 'Mémoires de l'Académie Impériale des Sciences, Belles-Lettres et Arts de Lyon;' 'Classe des Lettres, nouvelle Série,' tome 2me; by the Society. 'Annales de la Société Linnéenne de Lyon,' nouvelle Série, tome 1re; by the Society. 'Opuscules Entomologiques,' par E. Mulsant, cahiers 2, 3 and 4; by the Author. 'Mélanges Entomologiques,' par B. P. Perroud, 2me partie; by the Author. 'Die geographische Verbreitung der Europäischen Schmetterlinge in anderen Welttheilen,' von G. Koch, Leipzig, 1854; by the Author. 'Käferfauna für Nord und Mitteldeutschland,' 3 and 4 Lieferung, von M. Bach, Coblenz, 1854. Specimens of Formica cunicularia, ♂ and ♀, Myrmica ruginodis, M. scabrinodis, M. lævinodis, M. cæspitum and M. flavidula; by Mr. F. Smith. A piece of larch wood, from an old post, showing marks of the mandibles of wasps in biting off particles for building materials; by W. H. Watkeys, Esq., Stroud.

Exhibitions.

Mr. Stevens exhibited the first known British specimen of Goniodoma auroguttella (a species beautifully figured and described by Fischer-von-Röslerstamm), lately taken by him while sweeping on the banks of the Yar, in the Isle of Wight; specimens of a new Miana, captured near Darlington; a variety of Apatura Iris and a hermaphrodite Thecla Quercûs, taken near Rochester; and a new species of Eccoptogaster, found by Mr. Weaver in birch stumps at Rannoch.

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Mr. Foxcroft sent from Perthshire, for exhibition, the following Lepidoptera, recently taken there by him:— Phibalapteryx lapidata, Depressaria ciniflonella, Leptogramma Scotana, and Cheimatobia autumnaria.

Mr. Douglas exhibited a specimen of Crambus Cassentiniellus, taken by Mr. J. Hemmings on the downs near Brighton, remarking that it was not only a species new to Britain, but is only known to have been captured in Italy by Professor Zeller. He also exhibited a new Nepticula, bred by Mr. Weaver, in Scotland, from leaves of Vaccinium Vitis-Idæa, for which he proposed the name N. Weaveri; and a specimen of the scarce beetle Dictyopterus minutus, found by himself, on the 17th of October, on the palings of Addington Park.

Mr. Stainton exhibited leaves of various plants, each kind containing larvæ of different species of Nepticula; also leaves of hawthorn, containing larvæ of the beetle Ramphus pulicarius.

Motion communicated to Seeds by Insects.

Mr. Westwood said that Sir William Hooker had sent him some seeds received from the West Coast of America, which had excited some curiosity by jumping about: this motion was caused by an insect-larva in each of the seeds, and after a further examination he hoped to communicate some more particulars, and to obtain the name of the plant producing the seeds. Among them he had found an Ichneumon, which was probably a parasite on the enclosed larvæ.

Mr. Janson doubted if larvæ, perfectly enclosed as these were said to be, could possibly give "jumping" motion to the seeds; the President said that Réaumur, as cited by Kirby and Spence, had recorded an instance of a jumping chrysalis, and Mr. Curtis said he had verified Réaumur's statement, the insect being one of the Ichneumonidæ.

Economy of Grapholitha corollana.

Mr. Douglas read the following translation of part of an article by Professor Zeller, in the 'Zeitschrift für Entomologie des Vereins für Schlesische Insekten-Kunde zu Breslau,' No. 23, 1852 (published in 1854), observing that the species was not unlikely to occur in England.

"GRAPHOLITHA COROLLANA, Hub. fig. 282.

"*Tortrix corollana*, Frölich, Tort. Wurtembergiæ, p. 91, 218.

"*Graphol. corollana*, Duponch. Cat. p. 306."

After some critical remarks on the species, he says,—

"According to Frölich this Tortrix flies on flowers in May and June, but my experience is entirely contrary to this statement. I might assert that this Tortrix does not frequent flowers at all: it generally flies but little, and therefore is so seldom met with. Near Berlin I once caught several specimens on the 9th of May, towards evening, on the trunks of moderately thick aspens, and two of them were paired. Afterwards, in Frankfort on the Oder, on the 17th of March, from branches of aspen, which also contained larvæ of Saperda populnea, and which I had placed in water in a window exposed to the sun, I reared a fine female, which sat upon the young aspen-leaves. I then thought the larva had lived in the buds, and sought therein accordingly, but found only one larva, which I carefully described, but from which I only bred Penthina

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dealbana. At Glogau, on the 11th of May, 1851, on a young aspen, I caught a male which thus early was somewhat injured, going to prove that the time of flight could not extend far into the second half of the month, that consequently the indication of 'June' has not much probability, and, as all the allied species appear only once a year, there is no reason to think there is a second brood of this. In the year 1852 I procured, from two Coleopterists of this place, branches of aspen, in which were Saperda larvæ. On examination of the knots on the branches I noticed, in a defective part, an empty pupa-case projecting from the wood, and it immediately occurred to me that it might very likely belong to corollana. I therefore next examined other injured branches, and when I saw some larva-excrement hanging out of one I became certain that the larva of corollana lived in the wood of aspens. Only one of these branches furnished me with a moth, a male, which came out in the morning of the 11th of May. The branch was, underneath a twig, somewhat knotty and decayed. I had cut into it, in April, just down to the cavity wherein the pupa lay, in a web of powdered wood, with the head upwards, very lively, and still quite yellow. I fastened the pieces of the branch together again, and looked at it from time to time, and thus observed how the pupa became coloured. As it had lain with its head within the wood, I feared that, as in consequence of my cutting into the wood it had fallen out, I had replaced it in an unfavorable position, but this fortunately did not appear to have been the case. I saw, on the 11th of May, the pupa had worked itself out through a decayed part hitherto unobserved by me, from which it was almost entirely suspended; it became thus all but exposed; still it could make use of the spines of the abdomen, by means of which it had doubtless burst through the place of its exit, which had been prepared beforehand by the larva. At first I could not find the moth, and on shaking the box it did not fly off. At last I saw it sitting on a small bit of the wood, with its wings in a convex, roof-shaped position. In consequence of my having disturbed it, in my endeavours to put it into a small glass, it became very lively in the sunshine. A second fine example of corollana, which came out with the Saperda, I afterwards received from Herr Capt. Quedenfeld, one of the above-mentioned Coleopterists.

"It appears to me, from the foregoing details, that this moth is not so scarce as hitherto supposed, and that it may be obtained by breeding. For this purpose both old and young lower branches of aspens should be examined in the winter and spring, attention being directed to those having the knots of Saperda larva, as both these insects appear to stand in a certain sort of relation to each other. If the branches be put into water there will be no difficulty in the breeding; indeed the moth will be obtained earlier by the warmth of a room than it could be taken at large."

On Entomological difficulties.

Mr. Stainton read a paper entitled "On the difficulties experienced by Entomologists, as exemplified by recent experience with the Larvæ of the Genus Elachista."

Introduction of Bombyx Cynthia into Malta and Italy.

The Secretary, adverting to the mention of the subject at the March and June meetings of this Society, read, from the 'Journal of the Society of Arts,' July 14th, an account, transmitted by Col. Sir Wm. Reid, Governor of Malta, to the Duke of

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Newcastle, of the successful propagation and distribution in Italy of the larvæ of this moth.

"The following despatch and enclosures have been received through the Foreign Office:—

"Valetta, May 17, 1854.

"My Lord Duke—In my despatch dated 2nd February, 1854, I begged your Grace to inform the Society of Arts, Manufactures and Commerce, that through the very laudable efforts of Mr. Piddington, of Calcutta, with the aid of the directors of the Peninsular and Oriental Company (after many failures), I had received sound eggs of the Indian silkworm (*Bombyx Cynthia*), called by the natives 'Eria' or 'Arrindy,' and which feeds on the leaves of the castor-oil plant.

"These worms having passed through all their mutations in Malta in a healthy state, a second generation, from eggs laid here, are now hatching daily.

"I have also had the satisfaction of learning that cocoons sent from Malta to the Agricultural Society of Turin have produced moths. Eggs have also been sent to Rome, and I am preparing to send them to other places in Italy, where they have already been asked for.

"I am not sure whether the natives of India usually spin the silk of this worm or wind it, although it is said that by a weak solution of alkali they so far dissolve the gum as to be enabled to wind the silk. But we have not yet succeeded in doing so in Malta.

"I enclose, from a Malta newspaper, some account of the periods at which the first brood made their changes, and also, from the 'Piedmontese Official Gazette,' an account of their progress at Turin, both of which may be interesting to the Society of Arts.

"I also send for the Society of Arts a few old cocoons, left by the chrysalides on assuming the state of moths, in the hope that the Society may be able to find some means of dissolving the gum, by which the worm unites the silken threads.

"I have, &c.,

"(Signed) William Reid, Governor.

"His Grace the Duke of Newcastle, K.G."

*The Eria Silkworm of Assam.**

"Some time since, our contemporary the 'Mail' published the contents of a pamphlet consisting of extracts from the 'Journal of the Asiatic Society of Bengal' on the silkworms of Bengal. The idea of introducing into Malta one of the species, viz., the Eria, or Phalæna Cynthia, of Assam, was then already started; but it was still a question whether the very first step of the introduction could be successfully accomplished. It is now known that this difficulty has been overcome; that eggs have been brought, worms hatched, fed on the leaves of the castor-oil plant, have spun their silk shrouds, and gone through all the processes of their mysterious existence round to the egg again, in a room of the Palace of St. Antonio.

"'The subjoined memorandum, which we are authorised to publish, states the

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* 'Malta Times.'

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different stages of this process, the dates and appearance of the changes, and, in short, all the leading phenomena of the case:—

"'Through the laudable efforts of Mr. Piddington, of Calcutta, aided by the directors of the Peninsular and Oriental Steam Company, after many unsuccessful attempts, his Excellency the Governor has succeeded in obtaiuing sound eggs of the Assam silkworm, called in that country the Arrindy, Aria or Eria, and by naturalists the Bombyx Cynthia and also Phalæna Cynthia. These eggs, which arrived in Malta on the 2nd December, 1853, having been placed under the care of Dr. Frendo, M.D., at St. Antonio, produced upwards of 600 worms. The first which were hatched died apparently from cold. But after a fire was kept in the room, and the temperature at between 58° and 68° of Fahrenheit's thermometer, very few died, and latterly none. These worms were fed exclusively on the leaves of the castor-oil plant, the Ricinus communis of botanists.

"'On the 18th January some were observed to change their colour, and became of a light yellow.

"'On the 23rd January they underwent their second change; they then assumed a bluish green colour.

"'On the 28th January they commenced to undergo their third change.

"'On the 6th February they began the fourth mutation.

"'On the 8th February the first cocoon was observed.

"'On the 11th March fires in the room were left off.

"'On the 16th March the worms were in the state of chrysalis.

"'On the 12th April the first moth appeared, and

"'On the 17th April they began to lay their eggs.

"'By the 7th of the present month the greater part of the moths died, after depositing their eggs, the average duration of their lives having been about 14 days. Twelve cocoons weighed 4 drachms and 25 grains: the average weight of a cocoon according to this is 1-12th of a grain.'"

"We have just been informed (May 9) that some of the eggs are hatched this day.

"In addition we republish, extracted from the above pamphlet, all the portion of it relating to the Eria worm. It may be useful for those interested in the subject to compare the series of phenomena observed in Malta and in India, and to note any differences. It certainly is not unreasonable to anticipate much advantage from the 'Eria,' should the climate permit the establishment of this stranger among us. The Palma-Christi grows readily in Malta, and it will be seen from the statements of the pamphlet how great is the productive power of the worm, and how useful a manufacture can be derived from its produce, even under the disadvantage of its not being yet 'wound off.' The last sentence quoted from the pamphlet seems particularly worthy of attention. The Maltese, who have made so much of their cotton, will in any case be able to turn to good purpose the durable produce of the Eria worm, and should practical chemistry prove to have in store the solution of the problem, how to wind off the silk without breaking, a new and most profitable channel for exertion will have been opened to the patient and ingenious workers of these Islands."*

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* The matter referred to by the editor of the 'Malta Times' has already been published in the 'Journal of the Society of Arts.' It will be found in the number for March 3rd of the present year, p. 263.

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*Silk Culture.**

"At last, after many unsuccessful trials, we have had the good fortune to see the chrysalides hatched in Turin. Our correspondents, persuaded that *will is power*, were not deterred from the task, but by renewed exertions and successive attempts, have succeeded in their object of importing from Bengal to Turin the precious silkworm of the Indies.

"Our colleague Signor S. Giseri, so skilful in the rearing of silkworms, charged especially by the Royal Academy of Agriculture, writes us the following:—'The cocoons delivered to us by you on the 19th of March last, were placed in a dark room, where the mean temperature was kept at 20 centigrammes. I began to despair when I saw a month pass without any result, as at an equal temperature the cocoons of our country take only from 12 to 15 days to bring forth the moth; still the state of the chrysalis was not yet hopeless. The new insects just now come to life are very fine, with large and full wings, of a tawny colour, and having yellow oblong spots. I have already two pairs, which came forth two days since, and three males, which came forth yesterday, and am impatiently waiting for the appearance of their mates. The delay above mentioned was, to say so, providential, as the nourishment of the future worms was not yet ready; the young plants of the Ricinus (*Palma-Christi*) being only as yet furnished with their hard primitive shoots, although we had planted the seeds during the previous winter. I trust now we shall be able to rear up this new insect, which with so much anxiety, perseverance and outlay, has been brought over alive to Piedmont.'

"In the meanwhile we have received the intelligence that the Governor of Malta has successfully brought up a brood of them at Valetta.

"Sir W. Reid informed us, in his last, that he hoped to overcome the difficulties of unwinding the silk from the new worms, by using water slightly alkaline, and, what is perhaps better, water with a small quantity of *soap*, as the soda might perchance weaken the silk, and also injure its spinning quality.

"His Excellency Sir James Hudson, the English Minister in Turin, assures us that when at Rio Janeiro, two years ago, he had heard that a Lombard had come there for the purpose of attempting, on a large scale, the rearing of the Palma-Christi worm, as both this insect and the Palma-Christi thrive well in Brazil.

"Mr. Piddington writes us from Calcutta, on the 17th of March last:—'I have read with pleasure the various notices of the Bombyx Cynthia inserted in the 'Official Gazette' of Turin. I know that these silkworms thrive at Malta, although they have been somewhat affected by the cold. I have written to our common friend, the Governor of Malta, to inform him that the temperature of Assam varied from between 57° and 40° Fahrenheit, the temperature being 68° F. (20 centigrade, 16° R.), and that the north and north-east winds blowing there are very cold. The seed I have forwarded to him came from Bogorah (?), half-way between Calcutta and Assam, where the cold is very intense. There is a great quantity of ice in winter in the plains at Hoogly, distant about 25 miles north of Calcutta, by reason of the evaporation of water in porous and shallow pans. I have also brought up in the winter many of those silkworms (*une couvée de vers*), which I had not hitherto attempted, and I have seen many

* Translated from the 'Piedmontese Official Gazette.'

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perish in the early stages of their existence, the formation of the cocoons retarded, and every insect beginning to spin whilst still very small. In this we must admire one of the laws of Providence, to which every animal, and especially such prolific insects, must conform, namely, that there are seasons in which, owing to the atmospheric changes, and for want of sufficient nourishment, the insects die in great quantities. Were it not so, the world would not be large enough to contain them. I also warned Sir Wm. Reid that perhaps our rooms are too light for these insects, the light being injurious to their eggs, as it is to the germination of plants. In its natural state, the Bombyx Cynthia lives under the shade of green foliage, a very scanty light penetrating into the miserable huts of our ryots (peasants of Bengal). It is also believed that too much light is injurious to the production of silk. I give you a hint of these ideas, without commenting on them, being persuaded that you will exert yourself in every way for the successful rearing of these valuable insects. Lastly, let us bear in mind that these poor little animals are the first of their kind which have crossed the ocean, and been installed in the splendid palaces of the Knights of Malta, and that if you have an idea of presenting them at Court *je ne reponds pas des suites.*'

"Our spirited Mr. Piddington finishes by begging us to send his kind compliments to Signor F. Berzonzi, at Boulogne-sur-Mer, to whom we owe the first idea of the attempt to enrich Italy, if possible, with the new silkworm of the Indies.

"The problem, then, for the naturalist seems solved. This insect can be transported to, and successfully reared in, latitudes differing so widely from those of Turin and Assam in Bengal. The common Ricinus (*Palma-Christi*), especial food of the Cynthia, takes well in Piedmont; and already the production of the seeds more than pays the cost of cultivation. In the Province of Nice, in the Island of Sardinia, and in the more southern countries of Italy, the Ricinus grows luxuriantly. The silk-growers will now try how far it will answer to couple the rearing of the silkworm of India with that of China. The first yields in its native land seven crops of cocoons in the year, and supplies us with a finer and more beautiful silk. Naturalists and silk-growers will soon have the opportunity of trying a mixture of the two breeds; meanwhile, the experiments now made give every man to expect that the most sanguine hopes of those interested in the cultivation of silk will ultimately be realised. Let us close these few lines addressed to our numerous correspondents with the observation recently made by the celebrated naturalist, Geoffroy de St. Hilaire, President of the Paris Society of Zoological Acclimatation:—'The number of the species of animals generally reckoned by the modern naturalists exceeds 140,000, the greatest part of which will be perhaps always useless to man; whilst up to the present time we have not been able to domesticate more than 43 species.' How much, then, remains to be done, and why, for instance, should we not follow the example of the Canary Islands, which have already more than doubled the value of their rural products by the easy cultivation of cochineal, and attempt to introduce at once this valuable insect into the Province of Nice, or, at least, into the Island of Sardinia, where the Cactry spantia [? Cactus Opuntia] thrives in abundance.

"G. F. Barutt.

"Turin, April 29th, 1854."

Mr. Westwood said that Professor Solly had made several experiments on the cocoons sent by Dr. Templeton from Malta, and he believed he had discovered the much-desired method of unwinding the silk from the cocoon.

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November 6, 1854.

EDWARD NEWMAN, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Entomologische Zeitung,' July to October; by the Entomological Society of Stettin. 'Revue et Magasin de Zoologie,' 1854, No. 9; par M. F. E. Guérin Méneville; by the Editor. 'Journal of the Society of Arts' for October; by the Society. The 'Athenæum' for October; by the Editor. The 'Literary Gazette' for October; by the Editor. The 'Zoologist' for November; by the Editor. 'Smithsonian Contributions to Knowledge,' vol. vi.; 'Seventh Annual Report of the Board of Regents of the Smithsonian Institution for 1852;' 'Directions for Collecting, Preserving, and Transporting Specimens of Natural History,' 2nd Edition; 'Registry of Periodical Phenomena,' one sheet; 'Catalogue of the Described Coleoptera of the United States,' by Friedrick Ernst Melsheimer, M.D., revised by S. S. Haldeman and J. L. Le Conte, 1 Vol. 1853 (6 copies); 'List of Foreign Institutions in Correspondence with the Smithsonian Institution;' 'Natural History of the Red River of Louisiana;' (reprinted from the Report of Captain R. B. Marcy); all by the Smithsonian Institution, Washington, U.S. 'Boston Journal of Natural History,' vol. vi. No. 3; 'Proceedings of the Boston Society of Natural History,' pp. 225 to 384, November, 1852, to April, 1854; both by the Boston Soc. Nat. Hist. 'Proceedings of the Royal Society,' vol. vi. No. 102; 'Philosophical Transactions of the Royal Society,' Vol. cxliii. Part 3, Vol. cxliv, Part 1; 'List of the Royal Society, 30th November, 1853;' all by the Royal Society. Plutella annulatella (2) and Tinea ochraceella (2); by George Wailes, Esq. A box of Scotch Lepidoptera and Coleoptera; by Mr. Foxcroft.

Election of a Member.

Professor Edward Solly, F.R.S., F.L.S., &c., was ballotted for and elected a Member of the Society.

Exhibitions.

Mr. Stevens exhibited a new British beetle, Otiorhynchus septentrionis, *Herbst*, a single specimen taken by Mr. Foxcroft at Rannoch. He also exhibited some insects sent from Port Natal by Mr. Plant, including the rare Goliathus Derbyanus and Tefflus Delargorguei; also two living examples of an Iulus which were imported in a case of plants, and had been in his possession more than a fortnight.

Mr. Salt sent for exhibition a fly presented to him by a medical friend, who wrote concerning it "It was apparently blown out through the nostril by a gentleman who had long had pain in the face, and discharge of pus from the nose and throat. It is supposed to have been lodged in the 'antrum of Highmore,' a cavern that exists naturally in the bones of the face." It appeared to be Phora urbana. Mr. Westwood said he had reared species of this genus of fly from wool and animal rejectamenta, such as old crab-shells. Mr. Walker had reared them from Fungi, and Mr. Curtis from the body of one of the Sphingidæ.

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Mr. Stainton exhibited a specimen of the rare Elachista triseriatella, taken by Mr. Hogan near Dublin, and specimens of a new Simaëthis, for which he proposed the name S. Parietariæ, the larvæ having been found by Mr. Harding on Parietaria officinalis.

Luminosity of Helobia brevicollis.

Mr. Westwood said Mr. Gould had placed in his hands a specimen of the common beetle Helobia brevicollis, which he found one evening lately near Windsor, having been attracted thereto by its luminous appearance. Mr. Westwood thought the luminosity was due to adherent particles of phosphorescent matter arising from some decaying animal, or a Geophilus—one of the luminous Scolopendræ—on which the Helobia had been feeding; both these views, indeed, had been advanced with respect to a luminous Goërius, at a Meeting of this Society on December 1st, 1851, by the late Mr. Stephens, Mr. Curtis, and Mr. Smith.

Motion communicated to Seeds by Insects.

Mr. Janson, adverting to the Report of the discussion on this subject at the last meeting, said that in his remarks on that occasion he did not mean to deny that *any* motion could be communicated to the seeds by the imprisoned larvæ, but he still maintained that the possibility of larvæ, perfectly enclosed in seeds, having the power of causing the seeds to *jump* had not been explained. The instance quoted from Kirby and Spence he did not think was analogous, for that was evidently a naked chrysalis unencumbered by an extraneous envelope.

Mr. Westwood read the statement in Kirby and Spence's 'Introduction,'* which had been referred to, where, alluding to Réaumur's Memoir upon the enemies of caterpillars, they say, "Round the nests of the Processionary Bombyx he found numerous little cocoons suspended by a thread, three or four inches long, to a twig or leaf, of a shortened oval form and close texture, but so as the meshes might be distinguished. These cocoons were rather transparent, of a coffee-brown colour, and surrounded in the middle by a whitish band. When put into boxes or glasses, or laid in the hand, they surprised him by leaping. Sometimes their leaps were not more than ten lines, at others they were extended to three or four inches, both in height and length. When the animal leaps, it suddenly changes its ordinary posture (in which the back is convex and touches the upper part of the cocoon, and the head and arms rest upon the lower) and strikes the upper part with the head and tail, before its belly, which thus becomes the concave part, touches the bottom. This occasions the cocoon to rise in the air to a height proportioned to the force of the blow." In the same chapter of the 'Introduction' it is also recorded by the author, "that in 1810 a young lady informed him a friend had brought a similar chrysalis, which was found attached by one end to the leaf of a bramble. It repeatedly jumped out of an open pill-box that was an inch in height. When put into a drawer, in which some other insects were impaled, it skipped from side to side over their backs, for nearly a quarter of an hour, with surprising agility. Its mode of springing seemed to be by balancing itself upon one extremity of its case. About the end of October one end of the case grew black, and from that time the motion ceased; and about the middle of April in

* Vol. ii. page 299, 4th Edition.

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the following year a very minute ichneumon made its appearance by a hole it had made at the opposite end." Réaumur could not ascertain the fly that should legitimately come from the cocoon, for different cocoons gave different flies: whence it was evident that these ichneumons were infested by their own parasite. This might have been the case with the cocoon mentioned by the lady.

Mr. Westwood said, that though in this account the *chrysalis* was stated to be attached to the leaf, yet it was evidently an enclosed pupa, for its *case* is immediately afterwards mentioned. Since the last meeting he was satisfied the larvæ in the seeds were Lepidopterous, and thinking it possible that only those seeds moved that contained a larva infested by an ichneumon, he had inquired of Sir William Hooker if there were any exceptions, among the affected seeds, in the power of jumping, but was informed all gave equally strong leaps.

Mr. Curtis said that at the last meeting he had observed "he expected the seeds contained the larva of a Bruchus," and in confirmation of Réaumur, and of the possibility of an insect confined in a hard case having the power to give it motion, he had stated that "he had a compact horny oval cocoon formed by an ichneumon, which bounded about on a table like an India-rubber ball, shortly before the fly hatched." In order to identify the fact with the insect, he had searched for and found the specimen which had been disregarded for twenty years, and he now had the satisfaction of exhibiting the insect with its cocoon, and the label attached to it when the fly hatched. It was a Campoplex allied to C. majalis, *Grav.*, and probably described by that author; but the species of this genus being very difficult to identify, he would not venture to characterise or name it. These Ichneumonidæ are parasititic on the Tortricidæ and smaller moths, and also on the Curculionidæ.

Mr. Lubbock said it would not be difficult to demonstrate, according to the laws of matter and motion, that the muscular power of an insect in the situation referred to, if exerted in a particular manner, would cause a jumping motion in its envelope.

A new British Cynips and the Galls made thereby.

Mr. Rich, present as a visitor, exhibited some sprays of oak thickly covered with bunches of large galls. In Somersetshire generally, and in part of Gloucestershire, they were so abundant that the oaks were covered with them, to the extinction of the acorns, the loss of which, for feeding their pigs, the farmers greatly regretted, although he believed that in the value of these galls they had more than an equivalent, for their chemical qualities were nearly equal to those of the imported galls of commerce.

Mr. Curtis said, Mr. Rich recently gave him an example of this gall, and he had since received some of the galls with a specimen of the fly from his friend W. H. L. Walcott, Esq., who obtained these galls from an oak growing near the Hotwells, Clifton. Having paid great attention to the Cynipidæ,* and bred most of those which are produced from oak trees, he had often been doubtful regarding the true Cynips Quercus-petioli of Linnæus, but he was convinced the specimen he now

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* Vide vols. i. ii. iii. iv. and v. of the 'Gardener's Chronicle,' for the economy and figures of Cynips aptera, C. umbraculus, C. Quercus-tiaræ, C. lenticularis, C. Quercus-pedunculi, C. Quercus-ramuli, C. Quercus-castaneæ, and C. Quercus-folii.

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exhibited, which was bred with a few others from the galls alluded to, is the Linnean species. He believed all that have hatched are females, but as there are many maggots alive in some of the galls he expected the males would appear in the spring.

Cynips Quercus-petioli is described by Linnæus in his 'Fauna Suecica,' No. 1523, where he refers to Rœsel, who has given good figures of the galls, fly, &c.* The flies are much larger than any other species which has been described as British, and they are nearly allied to those produced from the galls of commerce, the Diplolepis gallæ-tinctoriæ of Olivier. He was inclined to think the species was of recent introduction into England, for during the time of his researches into the Cynipidæ neither he nor the many friends who assisted him with specimens from all parts of the country had ever seen it, and such conspicuous galls could hardly have escaped notice if they had existed.

Mr. Stainton said that for the last four or five years he had noticed these galls in Devonshire, but not in such profusion as now stated.

The President said he had some doubts if this was the Cynips Quercus-petioli of Linnæus, for the galls were situated in the axil of the leaf, and not on the petiole.

Chrysomelidæ of Australia.

Mr. Baly read the concluding portion of his Memoir on the Chrysomelidæ of Australia.

New Part of the Transactions.

Part 2, vol. iii. N. S. of the Transactions, published in October, was laid on the table.

December 4, 1854.

Edward Newman, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Catalogue of the Birds in the Museum of the East India Company,' Vol. i.; by the Hon. Court of Directors of the East India Company. The 'Literary Gazette' for November; by the Editor. The 'Athenæum' for November; by the Editor. The 'Zoologist' for December; by the Editor. The 'Journal of the Society of Arts' for November; by the Society. 'Revue et Magasin de Zoologie,' No. 10, 1854; by the Editor. 'Insecta Britannica,' Diptera, Vol. ii., by F. Walker; 'Lepidoptera—Tineina,' by H. T. Stainton; by the Committee of the 'Insecta Britannica.' 'List of Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part i. Lepidoptera—Heterocera; 'List of Specimens of Dipterous Insects in the Collections of the British Museum,' Part v. Supplement 1; 'List of Specimens of Neuropterous Insects in the Collection of the British Museum,' Part iv., Odonata; 'List of the Specimens of British Animals in the Collection of the British Museum,' Part xiv., Nomenclature of Neuroptera; all presented by Mr. F. Walker. The First Annual Supplement to 'Insecta Britannica, Lepidoptera—Tineina,' by H. T. Stainton; by the author.

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* 'Insecten Belustigung,' iii. Supp., tab. 35 and 36.

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Election of a Member.

George Wailes, Esq., Newcastle-on-Tyne, was balloted for and elected a Member.

Exhibitions.

Mr. Pickersgill exhibited a fine specimen of Argynnis Lathonia, and a variety of Vanessa Urticæ in which the colours of the upper wings were not distinct but suffused, and the under wings were almost entirely black. Both these butterflies he caught near Eastbourne, Sussex, on the 29th of July last.

Mr. Saunders exhibited two examples of a small patelliform nidus, probably of a spider, attached to a leaf of Chailetia latifolia received from Rio Negro.

Mr. Stevens exhibited some Coleopterous larvæ, which had destroyed a large cherry-tree drooping by forming galleries in the solid wood, a log of which he also showed. The larvæ were probably those of Gnorimus nobilis.

Mr. Tweedy exhibited a box of Coleoptera and Lepidoptera, among which were some new species, just received in fine condition from St. Domingo.

Photographic Representations of Insects.

Herr Pretsch, Manager of the Imperial Printing Office at Vienna, present as a visitor, exhibited a great number of magnified positive photographs of various insects and parts of insects.

Mr. Westwood observed, that though these figures gave very good general representations of the objects, yet the details were not sufficiently accurate for entomological purposes; indeed, he had never seen the small parts of insects delineated by this process with the clearness necessary to render the figures of scientific value.

Mr. Curtis thought that, if greater distinctness in detail could be attained, the photographic process would be invaluable for representations of the wings of the Ichneumonidæ and the neuration of wings generally.

Singular Specimen of Anthocharis Cardamines.

The President exhibited a specimen of Anthocharis Cardamines, which had been placed in his hands by Mr. W. Machin, of Mile End: the insect combined the characters of the sexes in a remarkable manner: the whole of the upper surface of the upper wings, as well as the antennæ, head, thorax and abdomen, present the normal appearance of a female: there was nothing whatever to induce a doubt of the individual being a female: the same observation applied to the left wings on the under side, but the right upper wing on the under side was adorned with the bright orange mark distinctive of the male. Many insects were known to be subject to what he (the President) had called *hemigynism*, *i. e.* when the individual is divided by a right line down the back, the one half being male and the other half female; the peculiarities of each sex extending not only to the distribution of colour, but also to the structure of the antennæ, eyes and genitalia; but the present instance differed from any that he had previously seen, in the fact of the entire upper surface being female.

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Introduction of Bombyx Cynthia into Malta and Italy.

Mr. Westwood exhibited a sample of the silk produced at Malta from cocoons of Bombyx Cynthia, which sample was given by the Governor, Sir William Reid, to Dr. Templeton, and by him forwarded to Mr. Westwood with the following letter:—

"Valetta, November 10.

"My dear Westwood,

"I take advantage of the Governor's kind offer to send you the enclosed silk, *unwound* from the Cynthia cocoons by Signor Lotteri, an Italian, skilled in silk-winding, who declared that his fingers stuck together for a very long time afterwards, so gummy and resiny was the binding matrix of the silk. The result seems very fine, and is, I believe, very strong, in comparison with the silks of similar thickness. At Casal Zebbourg a gentleman introduced, from the Governor's gardens, some of the worms, got little boys to tear the cocoons to pieces, and native women to spin it; and there is now hanging, in the window of Mr. Goodenough's shop, a pair of stockings and some lace-work made from the spun silk: the stockings have a muddy look, the colour of the enclosed, but in other respects appear fine substantial affairs, such as country people would be glad to get; and I believe they are everlasting. The great business is to get a machine to tear the cocoons to pieces, and that will soon follow, I presume. They have got the worm now into Tripoli in a fine healthy state; and planting castor-oil plant is now the order of the day everywhere.

"I trust the packet of live cocoons arrived safe, which were sent to you by the Governor's directions, per last mail. His Excellency was much pleased by the note in the 'Athenæum' respecting them.

"Very truly yours,

(Signed) "R. Templeton."

Mr. Westwood added that he had received the cocoons referred to, and found that some at least of the pupæ inclosed were alive, notwithstanding the long journey and the change of temperature to which they had been subjected.

The Secretary read, from the 'Journal of the Society of Arts,' November 10, the following extract from a despatch forwarded by Governor Sir William Reid to his Grace the Duke of Newcastle:—

"We have here in Malta gone through all the operations as practised in Assam, except weaving the silk thread into cloth. For this we have not yet a sufficient quantity; but the worms are breeding here faster than we can rear the castor-oil plant: they are now (in October) thriving in the open air, and as they consume the leaves of the castor-oil, they travel from plant to plant, feeding upon several, but apparently doing well only on the Ricinus.

"The French Government have applied, through their Consul, for a larger quantity of eggs, both for France and Algeria, and I have been enabled to supply him with as many as he requires.

"In consequence of statements published in the 'Journal of the Society of Arts,' I have had an application from the Agricultural and Horticultural Society of Grenada, in the West Indies, for eggs of this silkworm. Some fresh cocoons will be sent from hence to Grenada, and I am not without hope, from the way in which they are being

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conveyed, and with the assistance of the Directors of the Royal Mail Steam Company, that eggs in a sound state will reach the West Indies."

The Secretary also read the following extract from the 'Turin Gazette,' inclosed in the above-mentioned despatch:—

"*Culture of Silk in Piedmont.*—Sig. Vincenzo Griseri, the first person who has undertaken the rearing of the Bombyx Cynthia worm upon leaves of the castor-oil plant, and the first who introduced it into France, has now terminated his second experiment of rearing the said worms. Sig. Griseri, conceiving the great service that these valuable insects might render in the production of silk, diligently distributed them to the various provinces of the State, as also in Brianza, and has received from all quarters accounts of a successful result. He succeeded last spring in rearing these worms even upon the castor-oil plants while in the ground and in the open air, in the garden of the Chemical Laboratory, under the observation of Chevalier Cantu, Director of that establishment, the Minister, Conte de Cavour, his Excellency the Duke of Guiche, Minister Plenipotentiary of France, Professors Abbenne and Borsarelli, and many other distinguished personages. From this mode of treatment Signor Griseri discovered that these worms do not suffer from a low temperature, nor from strong winds, nor from continued rain; but, on the contrary, he obtained finer and better-formed cocoons than those produced by the ordinary method, all which circumstances have been submitted to the Royal Academy. After the first experiment he published, through the printers Chirio and Mina, the mode of bringing up these worms. In the second experiment he also fully succeeded, and found that the cocoons were superior to those brought from Calcutta and Malta, on which account he came to the conclusion that this new silkworm, a native of Bengal, has found its own climate in our country. An experiment is now being made as to the mode of extracting the silk, which has been confided to the care of able throwsters, and from some samples already produced it results that this silk is finer and more elastic than our common silk; further, two more important facts have just been communicated by Sig. Griseri, namely, that he has succeeded in feeding these worms exclusively upon willow-leaves and lettuce-leaves, and has obtained cocoons similar to those produced from the leaves of the castor-oil plant. During these experiments Sig. Griseri was assisted by the Countess Marianna Antonini, an experienced producer of silk, and Sig. Francesco Comba, a distinguished naturalist, who kindly offered him their aid and advice. Sig. Griseri intends next spring to try the rearing of our native grubs, the Pavonia major and the Pavonia minor, which feed upon various wild plants, and yet produce silk, as he has already confirmed this by experiment. There is reason to believe from these experiments made by so celebrated a silk-grower, well known by the numerous services he has rendered in rearing and improving the race of silkworms, that the culture of silk will receive a development, the limit of which can hardly be foreseen, as the object is nothing less than to convert the vegetable matter of the most common leaves into the valuable substance of silk."

Larvæ preserved in Canada Balsam.

Mr. Westwood said he had received examples of insect larvæ preserved in Canada balsam, by a gentlemen in Zurich, and he wished to state that they could be furnished at a very reasonable rate.

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Galls produced by Cynips Quercus-petioli.

Mr. Stainton, adverting to the mention of this subject at the last meeting, read the following extract of a letter received from R. C. R. Jordan, Esq., of Queen's College, Birmingham:—

"The galls are old friends of mine, I have known them for twenty years: of late they have been more common. I have here some fine specimens of the Cynips, or rather, in searching them out, I have four specimens: I have known the Cynips for three years. About five years ago a medical man at Lympstone, near Exmouth, used them always to make his ink, and tried to impress upon the country people the use that might spring from making them an article, so to speak, of exportation. But of course, as with all other things of this sort, they would gather the galls for him to make the ink, when paid for it, but never made any attempt to sell them elsewhere. They would be a good substitute for the nut-galls, and deserve to be used instead.

"The Cynips appears in September, perforating the gall by a single round hole. The galls themselves are first green, afterwards brown: the larvæ may be occasionally found in them in spring. I have never found any other than a Cynips larva in the galls: in the common cherry-like gall on the under side of the oak leaves, there is a larva of a saw-fly occasionally, and I have a notice of an ichneumon-parasite on the Cynips."

Mr. Stainton added that, since the last meeting, he had ascertained these galls were more than usually abundant this year in Devonshire.

Mr. Curtis hoped that Mr. Stainton would procure some of these galls, for he still doubted if those seen by Mr. Stainton and Mr. Jordan were identical with those he had referred to Cynips Quercus-petioli.

Mr. Westwood said he had announced the discovery of this species in England, in the 'Gardener's Chronicle,' some time since.

Larva of Ctenicerus murinus.

Mr. Curtis read a letter from the Rev. C. A. Kuper Trellich, Monmouthshire, stating that he had found, under a loose stone, a larva of a reddish colour, which he believed to be that of Ctenicerus murinus. The locality was the top of a wall in an elevated bleak situation, whereon stems of gorse had been laid and had decayed, in which stems, he presumes, the larvæ feed, for he had often found the perfect insects thereon while immature.

Locality of Papilio Antenor, Drury.

Mr. Westwood stated that this butterfly was long known only by the figure of Drury, until Mr. Hope received a specimen, taken, as he stated, by Ritchie, at Soudan, in Central Africa, which, however, was doubted by Mr. Edward Doubleday, who considered the species to be an Asiatic form. He had now to announce that the British Museum had just received a specimen from Madagascar. Was it possible the species could have so wide a geographical range, or had there been some error in the former instance?

Mr. Westwood also took this opportunity to state, as bearing upon this subject, that a beetle, Pachylomerus femoratus, stood in Mr. Hope's collection as African;

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another species or sub-species of the genus had now been received from Mozambique, on the Eastern Coast of Africa, and yet it had a great resemblance to the forms from Tropical Western Africa.

Economy of various Insects.

Mr. Curtis read a paper entitled 'Notes on the Economy of Various Insects.'

Essay on the British Formicidæ.

Mr. Smith read 'An Essay on the Genera and Species of the British Formicidæ,' in which twenty-eight species were described, being an addition of eleven species to the list of species known in 1851.

January 1, 1855.

Edward Newman, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for January; by the Editor. The 'Athenæum' for December; by the Editor. The 'Literary Gazette' for December; by the Editor. The 'Journal of the Society of Arts' for December; by the Society. 'Entomologische Zeitung' for November and December; 'Linnæa Entomologica,' 9 Band; all by the Entomological Society of Stettin. Hewitson's 'Exotic Butterflies,' Parts 12 and 13; by W. Wilson Saunders, Esq. 'Transactions of the Linnean Society,' Vol. xxi. Part 3; 'Proceedings of the Linnean Society,' Nos. 52—58; 'List of the Linnean Society, 1854;' 'Address of T. Bell, Esq., President of the Linnean Society, at the Anniversary, May 24th, 1854;' all by the Linnean Society. 'Proceedings of the Literary and Philosophical Society of Liverpool,' 1853—4; by the Society. 'The Entomologist's Annual for 1855;' by the Editor, H. T. Stainton, Esq.

Exhibitions.

Mr. Douglas exhibited a living specimen of Cratonychus castanipes, *Payk.*, one of the Elateridæ, which he found a few days since in the centre of a large mass of rotten wood thoroughly permeated with fungoid matter, which he dug out of an old oak stump, and within which it lay in an oval cell, at one end of which were seen the pellicles of the larva and pupa. This species, kindly determined by Mr. Janson, has not hitherto been recorded as British, though it probably exists in most collections mixed with Melanotus fulvipes, which it greatly resembles.

Mr. Stevens exhibited a fine specimen of the male of Jumnos Ruckeri, from Darjeeling, and a fine female of Dicranocephala Wallichii, from India; both beetles out of the same collection.

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Silk Felt produced by Saturnia Pavonia-media.

The President exhibited a specimen of silk produced at Vienna by the larvæ of Saturnia Pavonia-media called in Germany "Schwartzdornspinner:" he had received it through the kindness of Herr Pretsch, from whom he learned that a series of most interesting experiments were now in progress, the object being to obtain, from the labours of this insect, a silken felt impervious to water. The larvæ were confined separately in polished receptacles, from which there was no escape, and which presented no salient points that the cocoons could possibly be attached to, so that the whole stock of silk was exhausted on the smooth surface, and could afterwards be removed at pleasure. As the space allotted to each caterpillar was large and the stock of silk small, the coating was very thin, as in the specimen exhibited, but the felt was readily increased in substance by introducing a second and then a third larva, each of which readily worked on the felt manufactured by its predecessor. He did not know to what extent the experiments have hitherto been carried, but he believed they promised perfect success.

Note on Helobia impressa, Newman.

The President read the following memorandum on Helobia impressa:—

"I beg to exhibit some specimens of the insect which twenty-three years ago I ventured to describe as distinct, under the name of Helobia impressa; and I do this, not because I am now at all persuaded of its distinctness, but because the Rev. Mr. Dawson appears to have been unacquainted with the insect at the time he was preparing his invaluable 'Geodephaga Britannica.' Helobia impressa was found at a great altitude, on Ben Nevis and Ben Voirlich, by our friend Mr. Walker, and was distributed by him amongst entomologists at the time: the specimen which I beg to exhibit was captured by him. The difference between this and the common Welsh insect, Helobia nivalis, is this:—in nivalis, one interspace of each elytron, the *third* counting from the suture, is impressed with large deep foveæ; in impressa, two of these interspaces, the *third* and *fifth*, are thus impressed, giving the insect, at the first glance, a very different appearance. After having read Mr. Wollaston's admirable remarks on the effects of isolation on species, I will not presume to dwell on the importance of the character on which the species is founded, but I trust entomologists will agree with me that the subject is worthy of investigation, and that this very doubtful species ought at least to be separated from its Cambrian congeners as a named and locally isolated variety."

Improvements in Bee-hives.

Mr. Downie exhibited a model of a wooden bee-hive, containing, as he explained, several important improvements, proved by its use for the last three years. The improvements consisted of a moveable open floor with bars placed transversely to the bars of the hive, sliding above the true floor of the hive, and affording great facility for removing dead bees in winter without admitting cold air, a circumstance on which he laid much stress, as by the ordinary method of lifting the hive for the purpose of clearing the floor the bees were injured by the reduced temperature in the hive; and

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where the dead bees were not removed, as was too common, the effluvium arising therefrom was most prejudicial to the living bees: this winter, within a circuit of nine miles from his residence, he knew five hundred hives in which the bees had perished either from this cause or the want of ventilation. Another improvement was a set of openings below the false floor and at the top of the hive, which could be closed entirely or partly at pleasure, as occasion required, and by which the ventilation of the hive was at all times secured. The third improvement was a shallow zinc feeding-trough at the side of the moveable floor. The whole hive was surrounded by a loose wooden cover.

"*Notes on the Economy of Various Insects.*"

Under the above title the following notes, by John Curtis, Esq., were read:—

"As nothing can contribute so essentially to the advancement of the science of Entomology as a correct knowledge of the economy of insects, whether we regard their influence on the vegetable productions of the earth, or study them as a branch of Natural Science which has occupied the attention of some of the most celebrated philosophers of antiquity as well as those of our own age, I shall make no apology for laying before the Society this sketch of the habits and transformations of some species but little known, and to which I shall hope to make additions as opportunities may offer.

"In 1844 Col. Goureau contributed a memoir upon this subject to the Entomological Society of France,* full of truth and interest, and I trust the following observations may throw some light upon the early stages of various families of insects. I regret that several years have passed since many of the discoveries were communicated to me, and those facts which fell under my immediate observation were principally collected in the year 1848, in the Isle of Wight, in company with my esteemed and lamented friend Dr. Wm. Arnold Bromfield.

"*Anthemis Cotula.* Stinking Chamomile.

"On the 10th of August at least half the flower-heads around Ryde had the receptacles infested by little maggots, which ate into the solid parts, giving them a brown appearance when the florets were removed. They were cylindrical, shining and whitish, with two very minute sharp black hooks at the head. When arrived at maturity they contracted themselves, and assumed an oval form: they then changed inside the receptacle, or in cavities eaten on the surface, to oval pitchy pupæ, from which a fly (*Tephritis radiata*) emerged on the 12th of August. There were also scarlet larvæ of a Cecidomyia and various others, which evidently escaped my search from their minuteness, as from the flowers I bred the following insects:—from the 20th to the 28th August, Tephritis radiata, *Fab.*, 9 specimens; Cecidomyia, 2; Lasioptera, 3; Phytomyza lateralis, *Fall.*, 3.

"The Hon. C. Harris first detected the larvæ of the Phytomyza feeding in the receptacles of Pyrethrum inodorum.† The cocoons are elongate, cylindric, the ends

* 'Notes pour servir à l'Histoire des Insectes qui vivent dans le Chardon penché (*Carduus nutans*),' par M. le Colonel Goureau. 2nd Series, v. 3, p. 75, pl. 2.

† Vide Curtis's Brit. Ent. fol. and pl. 393.

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rounded, with two minute tubercles at the head; they are coriaceous, but very thin, shining, and of a straw colour.

"On the 22nd of September, from the same heads, I found hatched in the box—Cochylis subroseana, *Haw.*, 1; Phalacrus æneus, *Payk.*, 1; nov. gen.? of Staphylinidæ allied to Hypocyptus; and Pteromalus, 2 species.

"*Senecio Jacobæa.* Ragwort.

"There were small and large maggots in some of the receptacles which were more or less eaten out, the cavities being blackened with the dung of the larvæ, whilst others contained pupæ.

"On the 28th of August males of Tephritis marginata, *Fall.*, hatched, and on the 30th two females came forth; also three of Cecidomyia flava, *Meig.*

"The larva of the Tephritis is elongated, fleshy and yellow, attenuated at the head, which is furnished with two minute black hooks, and two trifid ferruginous spiracles at the tail. The pupæ are oval, but curved, black and shining like polished ebony.

"*Inula dysenterica.* Common Fleabane.

"The 11th of August the receptacles had been eaten into by a caterpillar, and the space was covered with dung. This caterpillar could descend by a thread: it was somewhat depressed, broadest anteriorly, the segments constricted and slightly hairy, ochreous with bright brown spots on the back, caused by the intestines shining through: the head was small, black and shining, with two black spots on the thoracic segment; the six pectoral feet were very minute, as well as the anal ones: the excrement towards the tail shone through of a green colour, and there was a spot at the tip. These, I suspect, are the caterpillars of a Tinea (*Aphelosetia? Inulella*),* two of which I bred from the flowers of the Inula on the 28th of August, and in all probability the larvæ feed on the seeds.

"On the 9th of September I bred also a female of Microgaster lacteipennis, *Curt.*; and on the 10th Pteromalus cupreus, a male, and an ichneumon allied to Trachyderma or Bassus.

"*Carduus lanceolatus.* Spear-thistle.

"On the 11th of August I found maggots in the receptacles, feeding on the seeds. They were fat, barrel-shaped, but attenuated before, shining ochreous-white; head furnished with two short black hooks, the tail with a circular ferruginous space, the lower margin pitchy, with two minute spiracles in the centre of the stern. The pupæ, which were imbedded in the woolly receptacles, were similar in form to the larvæ, being attenuated to the head and obtuse at the tail, and of an ochreous or rusty colour. From these, on the 4th of October, I bred a female Tephritis pallens, *Wied.*, and afterwards four males and eight more females.

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* "Vide my description in the Ann. and Mag. Nat. Hist., 2nd Series, v. p. 117.

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"*Juncus glomeratus.*

"Dr. Bromfield frequently found, attached to the bundles of seed-vessels, whitish cases in which the larvæ of some species of Coleophora had lived, and from which the moths had hatched about the third week in August, but most of them produced a minute dark green parasite of the family Chalcididæ, which prevented my ascertaining the name of the moth: possibly it is the Porrectaria leucapennis of Haworth, or the Coleophora cæspititiella of Zeller.

"*Artemisia maritima.* Sea Wormwood.

"At the end of September, 1852, I bred from this plant two specimens of a minute Cecidomyia? and a still smaller Entedon.

"*Pistacia Lentiscus.* Mastic.

"During my sojourn at Nice, in Piedmont, in 1850—51, I frequently found upon the Pistacia bushes, which grow wild on the rocky hills near Nice and Villafranché, galls attached to the midrib of the leaves, as large as scarlet bean seeds and somewhat of a similar shape: they were very plump, of a pale green colour, more or less rosy from being marbled with red. In the early part of December I opened and examined the contents of these galls, and found them to contain an Eriosoma, very like E. bursaria, *Linn.*, but larger, and also the pupæ of an Agromyza, rather larger than Phytomyza lateralis. It was of a cinereous tint, as if dusted with the white powder which enveloped the Eriosoma; the face white; antennæ black; legs ochreous; the thighs dark, tipped with ochre. I will name this provisionally Agromyza Pistaciæ. A Pteromalus also issued from the galls, no doubt a parasite of the fly.

"I once saw, on a lawn at Wilton, the larva of some genus of this family carrying off an earthworm several times its own length; and last May a gentleman near London caught a similar larva holding fast to a worm by its strong mandibles.

"After heavy rains I have observed the Carabus glabratus, *Fab.*, on the mountains in Yorkshire, emerge from their hiding-places and seize earthworms in their jaws, running off with them readily enough.

"The following species have been observed or reared from the larvæ by F. J. Graham, Esq., F.L.S.:—

"Helobia brevicollis, *Fab.* In turnip-fields, where the larvæ form cells about two inches below the surface, communicating with the surface by a vertical shaft.

"Malachius bipustulatus, *Linn.* Bred from an ash stump. It has also been reared from the stalks of an Echium by M. Vallot; and M. æneus, *Linn.*, has been obtained by M. Perris from stubble, where it undergoes its transformations. The larvæ are carnivorous.

"Elater longicollis, *Fab.* Reared from a pupa found in his garden at Cranford. The exuvia of the larva exhibits a structure of the tail somewhat like that of E. murinus? viz., with a denticulated margin and two horny processes at the apex.

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"Pezomachus agilis, *Fab.* Females of this ichneumon and Microgaster annulipes? were bred from the same bundle of cottony cocoons, and I have more than once observed the same fact. It may be inferred that the Pezomachus is the parasite of the Microgaster, yet it is possible their larvæ might inhabit the same caterpillar and the whole spin up together, for Ratzeburg has bred P. agilis from the larvæ or pupæ of Orthotænia Buoliana, P. hortensis from Tinea lichenella, and a third species, which he names P. terebrator, from the pupæ of Bombyx Salicis; whilst Schönherr has reared P. pedestris from larvæ of Hypera plantaginis, and Degeer has bred a species from the larva of a Curculio. Mr. Haliday bred a species of Pezomachus and Hemiteles fulvipes from the mass of cocoons formed by Microgaster intricatus.

"Scopula prunalis, *W. V.* End of April, the caterpillars feeding on the leaves of scarlet geraniums, at Cranford.

"Lophonotus fasciculellus, *Steph.* The caterpillars feeding on the leaves of Angelica sylvestris, leaving the entire membrane perfect like lace. Several specimens of this beautiful and curious Tinea were bred from them, together with a Microgaster.

"Tephritis guttularis, *Meig.* Bred from galls at the top or collar of roots of Achillea Millefolium.

"Heteroneura albimana, *Meig.* Bred from rotten willows. The pupæ resemble those of Piophila Casei.

"The following Staphylinidæ, which I have not seen in any other British collection, were captured by myself, and have not I believe been recorded as inhabitants of England:—

"Myrmedonia funesta, *Grav.*, I found in a fungus in Birch Wood, on the 6th of May, 1821.

"Gymnusa brevicollis, *Payk.* On the 13th of May, 1844, I swept a fine specimen off rushes by the side of a brook near the sea, at Covehithe, Suffolk; and Mr. Haliday also captured one on the edge of a pond near Holywood, Belfast.

"Eurypopus picipes, *Payk.* I took this rare insect in June, 1837: I believe it was found under a stone at Slaughter, in Gloucestershire.

"Stenus vafellus? *Erich.*, and S. æmulus, *Erich.*, I discovered in the marshes at Horning, Norfolk, on the 14th of July, 1840. I am indebted to Mr. Waterhouse for the names of these two species, which he found in my collection."

British Species of Stenus.

Mr. Waterhouse read a memoir, by himself and Mr. Janson, on the British species of the genus Stenus, with notes on the species of the genus in the collection of the late Mr. J. F. Stephens.

Brazilian Ants.

Mr. Smith read a paper, by himself, entitled "Descriptions of some Species of Brazilian Ants, with Observations on their Economy by Mr. H. W. Bates."

In his note on a new species, Eciton legionis, *Smith*, Mr. Bates says that he only found it on open, sandy and grassy *campos*, which kind of locality afforded him an opportunity of observing some parts of the habits of the species, and the business which occupies its immense processions. Among other things, he noticed that the

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column consisted of two trains of ants, moving in opposite directions, one train empty-handed, the other loaded with a variety of the mangled remains of insects, chiefly the larvæ and pupæ of ants.

Mr. Brayley, present as a visitor, remarked that this fact might illustrate one of the causes of the accumulation of insect remains seen in strata of the secondary geological formation, for if these trains of ants had been covered up suddenly, the stratum in which they were imbedded would in after time exhibit the same appearance as the deposits to which he had alluded.

Mr. Saunders observed, that insects were sometimes congregated together in immense numbers by local or accidental circumstances: he remembered especially that, a few years since, Galeruca Tanaceti was seen in immense numbers on the Norfolk coast.

Anniversary Meeting, January 22, 1855.

EDWARD NEWMAN, Esq., President, in the chair.

Election of Officers.

The Secretary read the chapter of the Bye-laws pertaining to the Anniversary Meeting, and the Report of the Library and Cabinet Committee made to and adopted by the Council. The Treasurer's accounts, duly audited, were laid before the Meeting, and it appeared that the finances of the Society were now in a better condition than at any former period. The ballot for four new members of the Council then took place, when F. Bond, Esq., J. Curtis, Esq., J. Lubbock, Esq., and J. O. Westwood, Esq., were elected in the room of W. S. Dallas, Esq., W. W. Saunders, Esq., S. J. Wilkinson, Esq., and W. Wing, Esq., and the following gentlemen were then elected officers for the year: John Curtis, Esq., F.L.S., &c., President; Samuel Stevens, Esq., F.L.S., Treasurer; J. W. Douglas, Esq., and Edwin Shepherd, Esq., Secretaries.

The President delivered the following Address, for which and his services to the Society during the last two years the Meeting passed a cordial vote of thanks, and requested he would allow the Address to be printed.

Votes of thanks were also passed to Mr. Stevens and Mr. Douglas for their services in the respective offices of Treasurer and Secretary.

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THE PRESIDENT'S ADDRESS.

GENTLEMEN,

Time, with that rigid punctuality which disregards alike human haste and human delay, relieves me to-night of those honourable duties with which you have entrusted me; and, permitted by custom, I indulge in a retrospective glance at our progress during the past year.

From the Report of the Library and Cabinet Committee you have learned that our books and collections are in good preservation, but that the exotic insects are in an unsatisfactory state as regards arrangement and naming; an invitation is held out, to such of you as are willing to give your services, to join the Committee and take part in this most desirable labour, and I sincerely hope I shall hear of members voluntarily coming forward and applying themselves to the task: I believe I may even now hint to the Society an offer by Mr. Smith to undertake the arrangement of the Hymenoptera, and we know that there is no member of our Society so capable of accomplishing the task.

I have particularly to congratulate the Society on the state of its finances as disclosed in the Auditor's Report just read: two years ago, owing to unusual and perhaps unavoidable outlay, the Society had incurred a debt which was only liquidated a few days before I came into office by the generous contributions of several of its members, but I am fortunate, peculiarly fortunate, in having presided over the Society for a period of two years during which it has been entirely self-supporting, during which the Chancellor of our Exchequer has drawn from legitimate sources all the funds requisite for the maintenance of our position, and now exhibits a large surplus applicable to our future requirements. I lay great stress on these facts, because I believe that all societies dependent on accidental, eleemosynary, or

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any extraneous support whatsoever, contain in themselves the elements of dissolution.

It appears that during the year we have elected ten members and three subscribers, and that we have lost three members by resignation and one by death, and one subscriber by resignation, thus giving us during the year an increase of six members and of two subscribers, a state of affairs on which I think we have every reason to congratulate ourselves: we have also elected, as corresponding members, Mr. Bates and Mr. Wallace, of whose indefatigable industry I said so much on the occasion of my last addressing you, and whose claims on us for the little courtesy thus rendered them will be freely admitted by all of you.

It is my painful duty to say a few words of that member of whom death has deprived us, on the very threshold of what appeared to all a brilliant and a prosperous career.

William Wing in early life was distinguished for his love of Natural History and for the care and accuracy with which he depicted natural objects: in the capacity of an artist he was frequently employed by Dr. Gray, of the British Museum, and the range of objects he delineated was very extensive: by degrees he appears to have turned his attention more and more to Entomology. In 1847 he was elected a member of our Society, and during the last and preceding years he filled the office of one of our Secretaries, but for many months he has been disqualified by illness from attending to the onerous duties which that office entails. He continued to employ his pencil in the cause of Science, and many of the illustrations of the Catalogues of the British Museum, of the Transactions of the Linnean, Zoological, and Entomological Societies, and of several other publications, are the work of his hands: a paper of my own, just published in the Transactions of our Society, owes any value it may possess to the surpassing accuracy with which he depicted the perfect insects, and the artistic skill with which, from very slender materials, he contrived to give most life-like figures of the larvæ. The illustrations of Mr. Stainton's volume on Tineina are also by his pencil, and his last effort was to draw the figures of Goniodoma auroguttella and Nepticula Weaveri for Mr. Stainton's 'Entomologist's Annual.' About twelve months ago a disease that almost always proves fatal exhibited itself, and this, acting on a constitution predisposed to consumption, terminated his life on the 9th of the present month, while in his 28th year. He was distinguished throughout his brief life by the most amiable and obliging manners, and he will be equally regretted for the amenity of his disposition and

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his skill as an artist: we have no one who can fill that department in science which his death leaves vacant. Mr. Wing was a Fellow of the Linnean Society, having been elected in 1852. I am only aware of two entomological papers that he has written: these are intituled

Characters of Three New Genera and Species of Lepidoptera. Proc. Zool. Soc. 1854, p. 104.

Descriptions of some Hermaphrodite British Lepidoptera, with figures of the Insects. Trans. Ent. Soc. v. 119.

I must here notice the loss which our Science, although not our Society, has sustained, in four other deaths which have occurred during the year.

Abel Ingpen was born on the 20th of May, 1796: he very early evinced a strong predilection for Entomology, and not only collected with indefatigable industry, but was remarkably careful and neat in his method of nomenclature and arrangement: the success of his labours is proved by the fact that in 1826, or less than twenty-eight years ago, he sold to the Manchester Museum a collection of British insects, of his own making, for the sum of £100: he again made a most valuable collection, not only of insects, but also of shells, fossils, birds' eggs, prints, rare books, &c., all which were arranged and preserved with the utmost neatness and care. He was elected an Associate of the Linnean Society in 1826, and was very regular in his attendance at the meetings of that learned body: he was an original member of the Entomological Society, and for years took an active part in its proceedings, but resigned his membership in 1849. He was also a member of the Microscopical Society, being devotedly fond of the microscope, and having made valuable observations on the structure of the scales on the wings of Lepidoptera. Mr. Ingpen was the author of the little work intituled 'Instructions for Collecting, Rearing and Preserving British and Foreign Insects, and for Collecting and Preserving Crustacea and Shells,' a neat, useful and extremely portable volume, which has gone through two editions, and which ought to be in the hands of every entomologist: to all who have written on "collecting" it forms what might be called the base of operations, and is more practical and more readily understandable than anything in our own language on the same subject. I find one paper by Mr. Ingpen in the Transactions of our Society,* intituled "Remarks on the

* Vol. i. p. 174.

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Destruction of Cocci." Mr. Ingpen was also an enthusiast in Horticulture, and contributed many articles to the 'Gardener's Magazine' and 'Horticultural Magazine.' His garden was so well stocked with rarities, and kept in such exquisite order, that the late Mr. Loudon paid it a visit for the express purpose of describing it in the 'Gardener's Magazine.' He died of cholera, at his residence at Chelsea, on the 14th of September, 1854, in the 58th year of his age. He was a man of mild and inoffensive character, and was beloved and respected by all who enjoyed his friendship. By far the greater part of Mr. Ingpen's contributions to science being strictly anonymous, I am unable to give any of their titles, with the exception of those above mentioned.

George Newport, whose name stands first and almost alone as a British physiological entomologist, was born at Canterbury on the 14th of February, 1803, and was apprenticed to his father, a wheelwright, residing in that city. His taste for Natural History was early noticed, and he was appointed to the Curatorship of the Natural History Museum immediately on its establishment: the decided bent of his inclinations, thus evinced, led to a dislike of business and to a preference for the study of medicine; he consequently became a pupil of Mr. Weekes, of Sandwich, and soon afterwards came to London to attend lectures at the London University: here he wrote a paper on the Nervous System of Sphinx Ligustri, and on the changes it undergoes while the insect is progressing to maturity. This essay was read before the Royal Society, and printed in the 'Philosophical Transactions.' No sooner was it known than its merits were admitted, and the author was at once acknowledged to be the most profound physiological entomologist that this country has produced. This remarkable essay is distinguished by the elaborate and conscientious care with which the most minute details are worked out, and it is worthy of record that many of the delicate and difficult dissections were made with the assistance of a single lens. Papers of a similar character rapidly succeeded each other, and occupied him almost up to the hour of his death: of these I can only give the titles; a volume might be occupied in critically analyzing the works themselves. He was elected a member of the Entomological Society in 1835, and filled the President's chair in 1843 and 1844, but resigned his membership in 1848: he was also a Fellow of the Royal and Linnean Societies. While engaged in his researches on the changes which the ovum of the frog undergoes during its development, it became necessary to examine the living objects in all their stages; and in his zeal to procure these, during the chilly

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months of February and March, he is supposed to have contracted that fever which terminated his life: he died at his residence in Cambridge Street, Hyde Park, on the 6th of April, 1854. I cannot conclude this notice more appropriately than in the words of Mr. Bell:—"He loved and followed Science for her own sake; and if occasionally he appeared somewhat tenacious of his opinions and over-anxious for his own fame, surely this was pardonable in one who gave up all for the pursuit of knowledge, depriving himself without a murmur of even the most common comforts, that he might devote himself the more unreservedly to the one noble object of his life. He worked for knowledge and perhaps for fame; but he never prostituted science to gain, nor mingled ignoble motives with his pursuits."

List of Mr. Newport's Scientific Papers.

On the Nervous System of the Sphinx Ligustri, and the changes which it undergoes during a part of the Metamorphoses of the Insect. Phil. Trans. cxxii. 383, and cxxiv. 389.

On the Respiration of Insects. Id. cxxvi. 529.

On the Temperature of Insects, and its connexion with the Functions of Respiration and Circulation in this Class of Invertebrated Animals. Id. cxxvii. 259.

On the Organs of Reproduction and the Development of the Myriapoda (1st Series). Id. cxxxi. 99.

On the Structure, Relations and Development of the Nervous and Circulatory Systems, and on the Existence of a complete Circulation of the Blood in Vessels in Myriapoda and Macrourous Crustacea. Id. cxxxiii. 243.

On the Reproduction of Lost Parts in Myriapoda and Insecta. Id. cxxxiv. 283.

On the Impregnation of the Ovum in Amphibia. Proc. Roy. Soc. v. 971; vi. 82, 171.

On the Respiratory Organs of the Common Leach (*Hirudo officinalis*) and their connexion with the Circulatory System. Id. iii. 206.

Monograph of the Class Myriapoda, Order Chilopoda, with Observations on the General Arrangement of the Articulata. Linn. Trans. xix. 265 and 349.

On the Aqueous Vapour expelled from Bee-hives. Id. xx. 277.

Note on the Generation of Aphides. Id. xx. 281.

On the Natural History, Anatomy and Development of the Oil-beetle (*Meloë*), more especially of Meloë cicatricosus of Leach.—First Memoir: The Natural History of Meloë. Id. xx. 297.—Second Memoir: The History and General Anatomy of Meloë, and its Affinities, compared with those of Strepsiptera and Anoplura, with reference to the connexion which exists between Structure, Function and Instinct. Id. xx. 321.—Third Memoir: The External Anatomy of Meloë in its relation to the Laws of Development. Id. xxi. 167.

On Cryptophagus cellaris of Paykull. Id. xx. 351.

On the Formation of the Air-sacs and dilated Tracheæ in Insects. Id. xx. 419.

On the Anatomy and Affinities of Pteronarcys regalis of Newman, with a Postscript containing Descriptions of some American Perlidæ, together with Notes on their Habits. Id. xx. 425.

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The Anatomy and Development of certain Chalcididæ and Ichneumonidæ, compared with their Special Economy and Instincts; with Descriptions of a New Genus and Species of Bee-Parasites. Id. xxi. 61 and 85.

Further Observations on the Genus Anthophorabia. Id. xxi. 79.

Further Observations on the Habits of Monodontomerus; with some Account of a New Acarus (*Heteropus ventricosus*), a Parasite in the Nests of Anthophora retusa. Id. xxi. 95.

On the Ocelli in the Genus Anthophorabia. Id. xxi. 161.

On the Predaceous Habits of the Common Wasp (*Vespa vulgaris*, L.) Ent. Trans. i. 228.

On the Use of the Antennæ in Insects. Id. ii. 229.

On the Habits and Structure of the Nests of Gregarious Hymenoptera, particularly those of the Hive-Bee and Hornet. Id. iii. 183.

On the Habits of Megachile centuncularis. Id. iv. 1.

On the means by which the Honey-Bee finds its way back to the Hive. Id. iv. 57.

Address to the Entomological Society at the Anniversary Meeting, 1844. Id. 1845.

On Iulus Sandvicensis et I. pilosus. Proc. Ent. Soc. Lond. 1842.

On the Parasitic Habits of Nomadæ. Id. 1842.

On some New Genera of the Class Myriapoda. Proc. Zool. Soc. x. 177.

On the Anatomy of certain Structures in Myriapoda and Arachnida which have been thought to belong to the Nervous System. Lond. Med. Gaz. 1838, p. 970.

A List of the Species of Myriapoda Chilopoda contained in the Cabinets of the British Museum, with Synoptic Descriptions of 47 New Species. Ann. & Mag. Nat. Hist. xiii. 94 and 263.

On the Genus Atya of Leach, with Descriptions of four apparently New Species. Id. xix. 158.

The Article "Insecta" in Todd's 'Cyclopædia of Anatomy and Physiology,' iv. 853—994.

Observations on the Anatomy, Habits and Economy of Athalia centifoliæ, the Saw-fly of the Turnip, and on the means which have been adopted for the prevention of its Ravages; being a Prize Essay proposed by the Entomological Society of London in conjunction with the Agricultural Society of Saffron Walden.

Lieut.-Col. Champion recently died at Scutari of wounds received in the Crimea: twenty years ago he was well known to the readers of the 'Entomological Magazine,' under the pseudonym of "Ionicus," by his admirable papers on the economy of certain Cephalonian insects, published in the third volume of that Journal: it is true that some of the statements there published related to facts previously familiar to entomologists, yet described with great care and evident originality; others, for instance the fact that Brachinus græcus explodes with its mouth, I have not seen elsewhere. "On the approach of danger," wrote the author, "this insect salivates and a bubble appears at its mouth; on contact with the air it explodes with a considerable report, and gaseous matter may be seen rising up like smoke: * * * on being immersed in boiling water to kill it, it let off one of these

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explosions, and the water for about an inch around it effervesced much in the same manner as a Seidlitz powder." Lieut.-Col. Champion collected botanical as well as entomological specimens, not only in Greece, but also in China and Ceylon. In the second volume of the new series of our 'Transactions,' he is spoken of by Mr. Bowring as "a very zealous entomologist:" he discovered many new Coleoptera, some of which are described by Mr. Westwood in our 'Transactions,' and one is named after him Callirhipis Championii. Lieut.-Col. Champion's scientific papers are as follow:—

Notes on Various Insects. By Ionicus. Ent. Mag. iii. 176, Id. 376, and Id. 460.

A foreign entomologist, Count Mannerheim, well known as an acute and diligent Coleopterist, and the author of a great number of Memoirs, most of them descriptive, published in the 'Bulletin de la Société Impériale des Naturalistes de Moscou,' died at Stockholm, on the 9th of October, 1854.

The interest as well as the attendance of our meetings has been well maintained, and many of the exhibitions and notices have led to animated discussions. Three subjects appear to be peculiarly worthy of remark: 1st, the production of silk by other insects than the well-known and invaluable Bombyx Mori; 2nd, the materials of which wasps construct their nests; and 3rdly, the communication of motion to seeds by the movements of an inclosed insect. With your permission I will say a few words on each of these.

One of the silk insects, and that which has obtained the most attention, is the Bombyx Cynthia, a native of Assam, the larvæ of which feed on the castor-oil plant (*Ricinus Palma-Christi*): it was first introduced to our notice by Mr. Spence, who read some extracts from the 'Journal of the Society of Arts,' from which it appeared that this insect was reared most extensively over a large part of Hindustan, more particularly in the districts of Dinagpur and Rangpur,—that the silk was of incredible durability, and the insect so prolific that twelve broods were reared in one year. Dr. Helfer, who transmitted the information, adds, that he estimates that no less than 150 of the Indian Bombyces form cocoons more or less adapted for manufactures. At the June meeting Mr. Westwood exhibited some of the cocoons of this insect, forwarded from Malta by Dr. Templeton, together with an inquiry whether any method was known by which the silk could be unwound; and finally, at the October meeting, our Secretary read extracts from the 'Journal of the Society of Arts,' showing that the insect had been introduced with complete success into Malta and

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Italy; and Mr. Westwood added that Professor Solly had made several experiments on the cocoons sent to England, and he believed a method of unwinding the silk from the cocoons had been discovered. At Vienna a number of experiments have been made with a view to introduce the silk of Saturnia pavonia-media as an article of commerce: the few particulars yet known were introduced to your notice by myself at a late meeting of the Society. From the information I have received on this subject it seems highly probable that these experiments will lead to the most important results, since the insect not only produces the raw material, but completes a fabric without the intervention of machinery. Nevertheless on these important topics a few commercial questions necessarily obtrude themselves: for instance, is there any difficulty in obtaining an ample supply of silk from the well-known silkworm? will the new species, or either of them, bear a greater degree of cold than the silkworm of China? can the silk be produced cheaper? is it more durable—of finer quality or colour? The man of science will be interested in all such discoveries as those to which I have alluded, but before we can engage the merchant in the cause we must point out to him its pecuniary advantages.

The materials used by wasps for the paper-like substance of which their nests are composed was brought under consideration, by the late Mr. Ingpen, at the July and August meetings: having detected fungoid matter in the nest of an exotic wasp, he thought it probable that those of our native species were not altogether composed of wood, as is generally believed; and, in corroboration of this idea, that lamented entomologist exhibited a piece of decayed wood from one of the cedars in the Botanic Garden at Chelsea, in which was a layer of fungus, and wasps were observed to frequent this, apparently for the purpose of obtaining building materials: in support of such a supposition I took occasion to observe to you that a mass of anomalous matter, cut from a wooden rail, had been found, on a microscopic examination, to be entirely fungoid. In connexion with this subject were two other statements of much interest: the first from the late lamented Mr. Wing, that he had seen wasps collecting the tomentum of a mullein; the other from Mr. Watkeys, that he had seen wasps at work on the stems of dead and dried nettles. I observed that all other speakers on the subject strove to establish the fact that wasps had been seen in the act of detriting the surface of palings, &c., a fact that I previously conceived to be so notorious as not to need this reiteration. Reverting, then, to the question raised by Mr. Ingpen, "What is the material actually used by wasps?" I am able with confidence to announce the

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following results:—The nest of Vespa Norvegica is not uniform in its composition: in one part it consists of very long, flat, cotton-like fibres, very much resembling, if not actually identical with, the long silky hairs attached to the seed of the cotton-grass (*Eriophorum*), intermixed with a very few fibres of woody tissue, and in a number of examinations a single fibre only was detected of coniferous wood: in another part of the same nest the cottony fibres of the supposed Eriophorum were intermixed with particles of the cuticle and large cellular tissue of what appears to be a species of Juncus. The nest of Vespa germanica is almost entirely composed of loose bundles of flexible cotton-like fibre, the material and structure being very similar to that in the nest of Norvegica, but other fibres are intermixed, precisely similar to those which compose the epidermis in the thistle tribe. The disposition of the fibres is similar in the material used by both these species: they look as if felted together. The exterior of the nest of Vespa vulgaris is composed of the vascular tissue of coniferous and other woods: spiral, cribriform and entire vessels occur in abundance, with fragments of divergent layers frequently adhering to them; the entire substance is composed of these materials, with a considerable admixture of transparent cementing matter having just the appearance of irregular films of isinglass: the interior of the nest is composed of the same materials more highly comminuted, and with a larger admixture of the cementing matter. When I tell you that the nests and names were obligingly supplied by Mr. Smith, and that the microscopic investigation was conducted by Mr. Bowerbank, unrivalled in his knowledge of intimate structure, you will see that the *facts* elicited must be received as final: the *conclusions* drawn from them may be various; my own conviction is that each species, or perhaps even each colony, may select the most accessible substance suited to its purpose: thus the wasp of the barren moor may find suitable material at hand in the gracefully flowing tresses of the cotton-grass, while our London wasp may obtain from every post and rail all that is required: again, the exotic species instanced by Mr. Ingpen may have built its dwelling in a region of Fungi, and have found in the dried fibres of these generally fugitive vegetables a fitting material for its purpose: again, the nest of the tree wasps, exposed to wind and rain, may need a different material from that used by the ground wasp, whose nest is always sheltered from the storm. Simple, and I trust satisfactory, as this explanation may appear, it is one which must fill our minds with the most profound admiration; for it exhibits a being which we heretofore supposed to be acting under the influence

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of a blind but unerring instinct, like a machine or automaton worked by steam or by clock-work; it exhibits that being in a new and unlooked-for character,—the character of a calmly reasoning architect, who, in the first instance, selects his materials according to the site of his building, and who, secondly, not finding at hand the material best suited to his purpose, substitutes another totally and widely different as far as all external appearances are concerned, still perfectly adapted to his requirings. It is held to be a triumph of intellect when a man thus substitutes one article for another and incurs no loss by the change, but here we have a much-despised insect constantly doing this, always reasoning on, and shaping its course by adventitious circumstances. Is it not a fresh proof of the perfect wisdom of that Power which has created and which upholds the Universe!

The third subject, which has attracted attention at some of our meetings, I am compelled to strip of its miraculous character: I allude to the so-called "jumping" of seeds. The seeds to which our friend Mr. Westwood alluded, in the interesting communication made at the meeting of October 2nd, were the cocci or compartments of the well-known tricoccous fruit of a Euphorbiaceous plant, the botanical name of which, if indeed such name exist, is not ascertained; but the general character of such vegetable productions is familiar to many of you: they may be said to possess three surfaces; one highly convex, almost hemispherical; the two others flatter, but still slightly convex: in the species under consideration, these cocci were about a third of an inch in length, and each of them contained an obese maggot, believed by Mr. Westwood and Mr. Stainton to be Lepidopterous, a conclusion which I am quite willing to believe correct, since I have long since observed the Coleopterous larvæ confine their ravages to farinaceous seeds, while Lepidopterous larvæ are not unfrequently found devouring the interior of oleaginous seeds, of which fact I might cite many apposite examples: this larva is contained within the coccus. Many of the cocci moved from the first; others were quiescent at first, and could only be induced to move by the application of warmth; many did not move at all: the motion was slight and of a rocking character, such as a man in a cask, a child in a cradle, or people in a boat, would produce; and which, repeated, sometimes amounted to a slow progressive movement, so that in some instances the cocci were eventually worked off the table by the movements of the contained larvæ: the motion was of course more observable when the coccus rested on its more convex than on its less convex surface; but it did not even then entirely cease. Dr. Hooker, who has most

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obligingly supplied me with this information, adds, "Many people saw this motion day after day; we had them exhibited at parties, and I think if you reflect you will agree with me that it is nothing more than a repetition of the old trick of the mouse in the egg, and"—here, gentlemen, I wish you to notice particularly Dr. Hooker's concluding words—"besides this rocking I never saw any other motion whatever." The accounts previously published in Réaumur and Kirby and Spence, of cocoons or pupæ possessing locomotive powers, and to which allusion was made at two successive meetings, do not appear to meet the case: they belong to quite another class of phenomena, and must still rest on their respective authorities, which I do not for a moment question, but which are totally independent of and totally unsupported by these more recent observations.

The year has been remarkable not only for the number but for the extent and the intrinsic value of its entomological publications. Of our own 'Transactions,'* of which four unusually valuable parts have been published, I refrain from saying anything, since every member must be thoroughly acquainted with them: of the other serials I say but a few words.

In the 'Annals and Magazine of Natural History'† for August is a description by Mr. Wollaston of an entirely new curculionideous insect, which that gentleman has called Pentarthrum Huttoni: it is one of the Cossonides of Schönherr, yet is so singularly constructed as respects the funiculus of the antennæ, which is five-jointed, that it may be regarded as connecting the Cossonides with the Rhyncophorides, in which a similar number of joints occasionally obtains: four specimens of this curious insect were extracted from the hard and undecayed wood of a cherry tree at Alphington, near Exeter, in November, 1853.

Mr. Stainton has commenced, in the 'Zoologist,'‡ an essay on Ento-

* 'Transactions of the Entomological Society of London.' New Series. Vol. ii. Part 7. 1854. Price 3*s.* 6*d.*
Id. 1854. Vol. ii. Part 8. Price 4*s.*
Id. 1854. Vol. iii. Part 1. Price 3*s.* 6*d.*
Id. 1854. Vol. iii. Part 2. Price 3*s.* 6*d.*

† 'The Annals and Magazine of Natural History.' London: Taylor & Francis. 1854. Nos. 73—84. 2*s.* 6*d.* each.

‡ 'The Zoologist: a Popular Monthly Magazine of Natural History, and Journal for recording Facts and Anecdotes relating to Quadrupeds, Birds, Reptiles, Fishes, Annelides, Insects, Worms, Zoophytes, their Habits, Food, Retreats, Occasional Appearance, Migrations, Nests and Young.' London: Van Voorst. 1854. Nos. 135—146. Price 1*s.* each.

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mological Botany, more especially with reference to the plants frequented by the Tineina. This work promises to be very useful: it is on the plan of Martyn's 'Aurelian's Vade-Mecum,'* published at Exeter in 1785, and a work which the late Mr. Stephens highly prized: it is an almost forgotten but invaluable witness to "the light of other days." Mr. Harding, the President of the Society of British Entomologists, has taken up the same subject, and has made various observations on the pupa-cases and food-plants of Micro-Lepidoptera: these will be found in various numbers of the 'Zoologist.'

In the January number of the 'Zoologist' I had the pleasure of recording the capture of Zygæna Minos in Ireland, by Mr. Milner, of Nunappleton, and in the September number are some valuable remarks on this interesting insect by Mr. A. G. More, who informs us that it occurs all around Castle Taylor, Ardrahan, and that he has traced it within the limits of the county Galway as far as Garryland: it is more particularly abundant towards the sea: it appears about the first week in June, and is in perfection until the middle of the month; it then swarms on many parts of the rock-strewn pasture so characteristic of the mountain limestone district of the West of Ireland.

In the December number of the 'Zoologist' is a minute description, by that indefatigable collector Mr. Bold, of a brachelytrous insect, which he has called Lathrobium carinatum: the very careful description has enabled our excellent curator, with little hesitation, to identify the species with the Lathrobium dentatum of Kellner, described at page 414 of the 'Entomologische Zeitung' for 1844; but even under the altered name the insect is new to this country, and an interesting addition to our insect Fauna: two specimens only have come under Mr. Bold's notice; one, a male, taken by himself under gravel by the river Irthing, in Cumberland; the other, a female, in a similar locality, on the Devil's Water, Northumberland, by Mr. Wailes.

In the same number of the 'Zoologist' is a notice of the occurrence of Dytiscus lapponicus in the Isle of Mull, together with a copy of Gyllenhall's description. The Rev. Hamlet Clark, who made this interesting discovery, says that he took four specimens on four different occasions, in a very deep lake in the Isle of Mull, in September, 1854. Mr. H. Clark expresses his belief that the Dytiscus septentrionis, distinguished by the smooth elytra of the female, will be

* 'The Aurelian's Vade-Mecum; containing an English Alphabetical and Linnean Systematical Catalogue of Plants affording nourishment to Butterflies, &c.' By M. Martyn. Exeter: 1785. 8vo.

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eventually referred to lapponicus: it seems to be now pretty clearly established that the smoothness or sulcation of the elytra in Dytisci is neither a certain character of species nor absolutely diagnostic of sex.

A great number of other notices occur in the 'Zoologist,' recording the capture of novelties or rarities, but I will not repeat them here, because that Journal is always on your table as soon as published; and, moreover, I believe I may congratulate myself on having each individual member as a subscriber.

In the 'Transactions of the Linnean Society'* are two beautifully illustrated papers by that distinguished entomologist whom, since I began to address you, you have elected as your future President. The first of these is intituled "On the Genus Myrmica and other indigenous Ants;" the second, "Remarks relative to the Affinities and Analogies of Natural Objects, more particularly of Hypocephalus, a Genus of Coleoptera." In the paper on British Ants Mr. Curtis enumerates five genera and sixteen species, two of which, Myrmica perelegans and M. denticornis, are presumed to be new to science. The paper on Hypocephalus has a double object; the first, used as a stepping-stone to the second, is to show that Hypocephalus belongs to the great Coleopterous section of Lamellicorns; the second, in the author's own words, is "to assist in fixing our systems on some firm basis, generally understood and universally to be adopted, so that we may no longer be tossed to and fro as we are at present." I am sure that every entomologist will give his meed of praise to so high an object as these words disclose, but I do not feel quite so confident that what I have called the stepping-stone to this philosophical eminence will be so generally availed of: I do not feel quite sure that entomologists will, with the same unanimity, agree to place Hypocephalus among the Lamellicorns, and I should scarcely be enacting my present part with perfect faithfulness were I not to say that I entertain a different view; but it must be distinctly understood that I dissent simply in my individual capacity as an entomologist, entirely disclaiming any importance for my dissent on account of the office which I have just relinquished; and I feel confident that Mr. Curtis will at once pardon what is simply an avowal of difference of opinion.

Mr. Stainton has published the first number of a new serial called the

* 'Transactions of the Linnean Society.' Vol. xxi. Part 3. 4to. Plates. London: Longman. 1854. Price 12*s*.

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'Entomologist's Annual:' * it contains much useful information, collecting in a concise manner the published records of novelties added to our lists of Lepidoptera, Hymenoptera and Coleoptera: these three orders are worked out respectively by Mr. Stainton, Mr. Smith and Mr. Janson. Mr. Stainton has likewise issued a second edition of the 'Entomologist's Companion,' † and has completed the Museum Catalogue of the British Lepidoptera ‡ interrupted by the death of the lamented James Francis Stephens.

Mr. Walker, with a laborious assiduity which I have never known surpassed, has produced four Parts of the Museum Catalogue.§ Some idea of these important works may be gained by the following summary. The first list is intended to include short descriptions of all the species, genera and families of Lepidoptera: the first part contains descriptions of 508 species, of which 114 are Cydimonii and 394 Zygænides; in the Cydimonii there are 21 new species, and in the Zygænides 175: the second part contains descriptions of 575 species of Lithosiidæ, of which 276 are new: the total number of species is 1083, of which 472 are new. The second list includes descriptions of the species of Diptera not characterized in the first series of the same work or in the 'Insecta Saundersiana:' the first part contains 379 species of Stratiomydæ, of which 26 are new; 36 of Xylophagidæ, of which 1 is new; and 830 of Tabanidæ, of which 31 are new: the second part contains 74 species of Acroceridæ, and 470 of Asilidæ, of which 8 are new: the total number of species is 1789, of which 66 are new.

Mr. Andrew Murray, of Conland, has published an admirable

* 'The Entomologist's Annual for 1855, comprising Notices of the New British Insects detected in 1854.' Lepidoptera, by the Editor, H. T. Stainton: Hymenoptera, by Frederick Smith: Coleoptera, by E. W. Janson. Col. Plates. London: Van Voorst. 1855. Price 2*s.* 6*d.*

† 'The Entomologist's Companion.' Second Edition. By H. T. Stainton. London: Van Voorst. 1854. Price 3*s.*

‡ 'List of the Specimens of British Animals in the Collection of the British Museum.' Part 16. Lepidoptera completed. London: 1854. Price 3*s.*

§ 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum.' Part 1. Lepidoptera: Heterocera. London: 1854. Price 4*s.*

Id. Part 2. Lepidoptera: Heterocera—continued. 1854.

'List of the Specimens of Dipterous Insects in the Collection of the British Museum.' Part 5, Supplement 1. London: 1855. Price 4*s.* 6*d.*

Id. Part 5, Supplement 2. 1855. Price 3*s.*

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'Catalogue of the Coleoptera of Scotland:'* this little work not only equals but far surpasses any Catalogue of Coleoptera ever published in England: it exhibits an acquaintance with the best continental authorities and great power in adjudicating the true value to supposed species. It is a source of the most unmixed pleasure to me to see Scotland, the finest field for the naturalist in the Queen's dominions, thus understood, appreciated and illustrated by one of her own sons.

Our indefatigable friend Mr. Westwood has just published a reissue of his work on the Butterflies of Britain,† and also a Supplement to Wood's 'Index Entomologicus,'‡ which "contains five plates now first engraved, exhibiting 180 coloured figures of British moths and butterflies not included in the former edition of the 'Index Entomologicus,' with synonyms and localities, also a systematic list of the whole of the species, in order to show their distribution into families and the position of the supplemental species, and of those whose generic classification has been modified."

Messrs. Baikie, Barron and Adams have published a work intituled 'A Manual of Natural History for the Use of Travellers.'§ This volume contains 750 pages, 150 of which are occupied by Entomology.

I now arrive at the Rev. J. F. Dawson's Monograph of the Carnivorous Ground-beetles,‖ a work that bears internal evidence of invincible assiduity and a profound knowledge of the subject. This volume is less remarkable for the amount of new matter it contains than for the mass of old and worthless matter which it sweeps away. Nothing was ever more extraordinary than the wholesale destruction of names which Mr. Dawson has achieved. Those entomologists who had

* 'Catalogue of the Coleoptera of Scotland.' By Andrew Murray, of Conland, W. S. Blackwood: Edinburgh and London. 1853.

† 'The Butterflies of Great Britain, with their Transformations delineated and described.' By J. O. Westwood, Esq., F.L.S., &c. Col. Plates. London: Orr. 1855. Price 15*s*.

‡ 'A New Supplement to Wood's Index Entomologicus, or a complete Illustrated Catalogue of the Lepidopterous Insects of Great Britain.' By J. O. Westwood, Esq., F.L.S., late President of the Entomological Society, &c. Col. Plates. London: Willis. 1854. Price 12*s*. 6*d*.

§ 'A Manual of Natural History for the Use of Travellers, being a Description of the Families of the Animal and Vegetable Kingdom.' By Arthur Adams, William Balfour Baikie and Charles Barron. London: Van Voorst. 1854. Price 12*s*.

‖ 'Geodephaga Britannica. A Monograph of the Carnivorous Ground-beetles indigenous to the British Isles.' By John Frederic Dawson, LL.B. Col. Plates. London: Van Voorst. 1854. Price 12*s*.

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reserved long gaps in their cabinets, under the fond idea that these were to be eventually filled, now find that half the names for which this extensive accommodation was prepared actually signify nothing, while a large portion of the remaining moiety is comprised of names erroneously applied. I do not lay this enormous mass of error at the doors of any one or two or three individuals who may have been more actively engaged than the rest in literary labours in Entomology: we have all more or less contributed to this confusion by fostering a morbid desire for novelty, and a consequent tendency to exalt unreasonably the importance of accidental and inconstant differences. The numerical diminution of names in Mr. Dawson's work extends to the genera as well as to species, and no less than 31 genera, which had become familiar as household words, have merged in others and disappear: these are — Lamprias merged in Lebia; Helobia and Pelophila in Nebria: Blethisa in Elaphrus; Trimorphus in Badister; Platynus and Agonum in Anchomenus; Pœcilus, Abax, Platysma, Adelosia, Steropus, Omaseus, Argutor and Platyderus in Pterostichus; Celia, Acrodon, Percosia, Bradytus and Curtonotus in Amara; Ophonus in Harpalus; Epaphius in Trechus; Cillenum, Tachys, Ocys, Philocthus, Peryphus, Notaphus, Leja, Lopha and Tachypus in Bembidium. These are sweeping alterations, but I think there is no doubt they will be regarded as wholesome ones, for this department of our science had really become overloaded with names that signify nothing. The actual additions to our British Geodephaga make slight compensation for the large deductions: these are twenty-one in number, and are highly interesting in character:—1. Dyschirius obscurus of Gyllenhall, found by Mr. Haliday on the sandy shores of Lough Neagh. 2. Dyschirius impunctipennis of Dawson, found by the author by the side of a stream on the Smallmouth sands, near Weymouth. 3. Dyschirius jejunus of Dawson, found by Mr. Bold, of Newcastle, on a sandy bank of the river Irthing, in Cumberland, a little above Lanercost Abbey. 4. Anchomenus atratus of Duftschmidt, first captured in Hampshire, afterwards in Cornwall and other western counties of England, and very abundantly near Bristol. 5. Amara curta of Dejean, not uncommon on the sand-hills at Deal, in company with lucida and tibialis, but readily distinguishable from either by its broader form. 6. Amara ingenua of Duftschmidt, a well-known European species, but unique as British, the only known example having been captured in Scotland. 7. Harpalus cordatus of Duftschmidt, also well known on the Continent and also unique as British; the only example was captured by the author near Deal, at the roots of

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tall wing-grass which grows on the sand-hills. 8. Harpalus rupicola of Sturm, found in chalky districts, Dorking, Basingstoke and the Isle of Wight. 9. Harpalus sulphuripes of Germar; a single example taken near Bristol. 10. Harpalus Wollastoni, of which four or five specimens were captured by Mr. Wollaston, in May, 1852, at Slapton Ley, Devonshire. 11. Harpalus melancholicus of Dejean, captured by Mr. Wollaston near Swansea. 12. Stenolophus elegans of Dejean, found by the Rev. Hamlet Clark between Sheerness and Queensborough, in the Isle of Sheppey. 13. Stenolophus derelictus of Dawson, found near London by Mr. F. Smith. 14. Stenolophus exiguus of Dejean, discovered in England by Mr. Samuel Stevens, who captured a few specimens on Bury Hill, near Arundel: a single specimen was taken by Mr. Wollaston in the Isle of Wight, and Mr. Dawson himself subsequently took a series of the insect on the sands at Pegwell Bay, near Ramsgate, in February, 1849. 15. Bradycellus cognatus of Gyllenhall, a mountain species, which appears to occur only on the high moors of Wales, Yorkshire and Scotland. 16. Bembidium fluviatile of Dejean, taken by Mr. Hadfield, of Newark, on the banks of the Trent at Kelham. 17. Bembidium stomoides of Dejean, captured by Mr. Bold, of Newcastle, on a sandy bank by the Irthing. 18. Bembidium obliquum of Sturm, found also by Mr. Bold, at Gosforth, in Cumberland. 19. Bembidium Schuppelii of Dejean, found by Messrs. Bold, Murray and Wailes, on the banks of the Irthing. 20. Bembidium Doris of Panzer, an insect of rare occurrence in the salt-marshes of England. And lastly—21. Bembidium callosum of Kuster, found by Mr. Steuart on Woking Common. I believe the whole of these twenty-one insects to be perfectly distinct as species, certainly all of them are new as British. It would have been a labour of love with me to have abridged the minutely accurate characters which Mr. Dawson has drawn up for each of them, but I think that every British Coleopterist is bound to possess himself of this valuable volume.

In next calling your attention to Mr. Stainton's work on the British Tineadæ,* it seems necessary to glance at the previous closet-history of these minims of their tribe: this closet-history commences in 1829 with the publication of the fourth Part of Haworth's 'Lepidoptera Britannica,' a monograph the most complete, the most learned, the most useful, ever published on the Entomology of Britain, and

* 'Insecta Britannica.' Lepidoptera: Tineina. By H. T. Stainton. 8vo. Plates. London: Lovell Reeve. 1854. Price 25*s*.

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one which will long remain an invaluable treasure to the Lepidopterist. The sterling good qualities of Haworth are, first, that he described from Nature, and, secondly, that he described well: he says, "My specific and detailed descriptions of every species and variety are entirely new-wrought, and from British specimens, except in a few instances, where I either had no British specimen, or where they were not very good, in which cases only I have extracted the description of Linneus, Fabricius or Villars, and in no instance without a proper acknowledgment." That Haworth, working almost alone, should have fallen into some errors is not only excusable, but must be regarded as a necessary consequence of this comparative isolation: thus it need not be concealed that in several instances he multiplied species unnecessarily, while in others he reduced Nature's species to the rank of varieties; but these last he distinguished by the significant memorandum "Fortè propria species." Of the Tineadæ, the family to which my observations are now exclusively directed, Haworth described 286, and from that period the study of the Micro-Lepidoptera appears to have received an impetus which culminated in the appearance of Mr. Stainton's volume: the great labourers in this fruitful vineyard to whose names I would particularly call your attention are Mr. Stone, Mr. Bentley, Mr. Chant, Mr. Stephens, Mr. Edwin Shepherd, Mr. Bedell, Mr. Douglas, Mr. Samuel Stevens, Mr. Doubleday and Mr. Weir; and more recently Mr. Wing, Mr. Allis, Mr. Wilkinson, Mr. Boyd, and many others, have laboured assiduously in the field: the collections of Stone, Bentley and Shepherd have stood out conspicuously and prominently from the rest: that of Stone was, for its day, incomparably the finest, but merged in that of Bentley, and eventually in that of Shepherd, which I presume now stands as a whole entirely without a rival, although perhaps equalled or surpassed in all groups except the Tineadæ by that of my worthy friend Doubleday: still, although the labourers have been so many and so successful, two of them appear to me to call for individual notice, and these are the late James Francis Stephens and William Bentley, both of them distinguished for the extreme liberality, candour and pains-taking with which they opened their collections, compared specimens, explained differences, and unlocked and made patent without reserve the arcana of the science; and to the memory of Mr. Stephens a still greater debt of gratitude is due, for the free use he allowed all students to make of his magnificent library of entomological works. Mr. Stainton is now in the possession of this library, and, with such an accession to his own previously extensive collection of authors on Lepidoptera,

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possessed of an energy which no obstacle can resist, an assiduity which no amount of labour can weary, and turning his attention almost exclusively to these minims, it is not extraordinary that he should have produced, as he has done, a second most useful monograph on a subject already ably treated. It contains really elaborate descriptions of 591 species, of which 272 are not given as species by any other British author. I say advisedly "as species," because I am well aware that "as varieties" some few of them are noticed by the illustrious Haworth, in whose footsteps Mr. Stainton has closely followed, by carefully describing every species, as he himself assures us, from actual specimens. It would far exceed the limits, and indeed the object, of an evanescent summary like this, were I to give even the names, authorities and localities of the new species, as I have done in the instance of Mr. Dawson's Geodephaga: the most superficial mention of 272 species would occupy an hour at least, and I will not venture such a tax on your patience. All that I can do is cordially to recommend Mr. Stainton's volume, and to hope that all may profit by it equally with myself. The copious and almost crowded illustrations by the pencil of our deeply-lamented assistant-secretary are worthy of attentive study.

But the most important and valuable work I have to notice, and the one which as a work of science will confer most honour on this country, is the 'Insecta Maderensia' of Mr. Wollaston.* This work is distinguished throughout by persevering industry, profound knowledge and philosophical spirit. Nothing can exceed the industry with which the author has pursued his object, a fact that will be sufficiently evident when I state that he has described 213 genera and 482 species of Madeiran Coleoptera, out of which 41 of the genera and 270 of the species are now characterised for the first time, and are therefore absolutely new to science. With regard to the solid entomological knowledge possessed, and in every page made manifest without display, there can be but one opinion, for not a single species or genus is mentioned unaccompanied by the evidence of a perfect knowledge of its antecedent history: this, I am aware, is very high praise, but it is praise which no one can say is unmerited. The philosophical spirit is manifested equally in the masterly characters given of every genus and species, and in the explanatory remarks which invariably follow

* 'Insecta Maderensia; being an Account of the Insects of the Islands of the Madeiran Group.' By T. Vernon Wollaston, M.A., F.L.S. 4to. Col. Plates. London: Van Voorst. 1854. Price £2 2s.

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each description; and I must not omit to add that these descriptions and remarks are invaluable to the British Coleopterist, because a large proportion of the genera described and cited for comparison are familiar to us as indigenous to Britain. Into such descriptions and such remarks it is impossible for me to enter here, but I cannot forego the opportunity of citing some general observations which appear to me of more than ordinary value. The statistical conclusions forced on Mr. Wollaston's attention by his analysis of the Madeiran Coleoptera are as interesting as unaccountable. In this mild and sunny isle there is not a single representative of those lovers of warmth and sun, the Cicindelidæ and Buprestidæ; in the deep mossy ravines there is no representative of the moss-loving Pselaphidæ; in this land of flowers the flower-feeding lamellicorns and the Elateridæ have each but a single and abnormal representative: descending to genera, the cosmopolitan Carabus, Nebria, Silpha, Necrophorus, Cetonia, Telephorus, Tentyria, Pimelia, Acis, Asida and Otiorynchus are entirely unrepresented. The numerical proportion of the thirteen great groups of Coleoptera present in Madeira is as follows:—

Rhyncophora	104
Necrophaga	80
Brachelytra	74
Geodephaga	63
Serricornes	35
Atrachelia	29
Cordylocerata	22
Phytophyga	21
Pseudotrimera	17
Philhydrida	13
Trachelia	11
Hydradephaga	7
Longicorns	6
	482

The most remarkable feature in this list is not the preponderance of Curculionidæ, Necrophaga, Staphylinidæ and Carabidæ, all of which one would suppose abundant, but the extremely small number of water-beetles and longicorns: 4 Colymbetes, 2 Hydropori, and the familiar Gyrinus natator, are all the Hydradephaga. Mr. Wollaston thinks that this paucity is not difficult to understand, "the rapid nature of the rivers, which are liable to sudden inundations from the mountains, and to deposit their contents in positions distant from their banks, or to pour in ceaseless torrents over the perpendicular faces of

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the rocks," being peculiarly unfavorable to the preservation of insect life: this is a reasonable solution, but how shall we account for the absence of Cerambycidæ from this island of woods? and how shall we account for the great scarcity of all flower-loving Coleoptera, except on the supposition that their office of pollen-bearers is performed by the hosts of Hymenoptera and Diptera. Mr. Wollaston's remarks on the effects of isolation on species are worthy of deep study and attention; they will be found appended to the descriptions of Scarites abbreviatus, Calathus complanatus, Harpalus vividus, and the Ptini: after alluding to the two sections of the latter, the author proceeds to say that "the representatives of both are subject to very great variation in size and colour, and, since even the sexes themselves often display considerable incongruity, *inter se*, it is not surprising that the boundaries between some of the species which are nearly allied should be difficult to trace out. Such being the fact, it is impossible to overrate the importance of studying them *in situ*, so as to be enabled not only to connect the numerous aberrations, but even at times, perhaps, in a certain measure, to account for them; since it is by this process of inquiry that we are more likely to arrive at truth, than by the collation of treble the amount of individuals, at a distance, when anything like local phenomena in connexion with them must be entirely overlooked. So completely, indeed, are some of the Madeiran Ptini affected by isolation, and by an exposure to a perpetually stormy atmosphere, that they do not attain half the bulk on many of the adjacent rocks that they do in the more sheltered districts of the central mass; and so marvellously is this verified in a particular instance, that I have but little doubt that five or six species, so called, might have been recorded, had only a few stray specimens been brought home for identification, without any regard having been paid to the respective circumstances under which they were found. Judging from many hundred examples which I have submitted to a close comparison, the most constant of their characteristics would appear to be outline and sculpture, whilst size and colour are apparently the least to be depended on, and hence trifling differences may be often of specific indication in the former case, where in the latter much larger ones are worthless." Again, the observations on Tarphius, one of the Colydiidæ, a family of Necrophaga, are replete with interest: prior to the publication of Mr. Wollaston's work a single species was known, and this of the greatest rarity; it was taken in Sicily by the late lamented Coleopterist Mr. Melly. Mr. Wollaston has added no less than fifteen Madeiran species, all of which appear to be abundantly distinct. "Of

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the influence and economy *in situ* of such an assemblage it is not easy to speculate; suffice it therefore to remark that the enormous numbers in which they exist, when compared with the limits within which they are confined, would seem to point to some especial end which they may be presumed to fulfil amongst the insect population of those remote upland districts. Meanwhile it is far from improbable that, like many of the Nitidulidæ and the xylophagous groups, they may assist materially in the decomposition of the superfluous masses of loose rolling timber with which the damp ravines and dense mountain slopes of Madeira everywhere abound. To such localities it is that they are exclusively assigned, occurring in the greatest profusion in those spots which are the least accessible, and where consequently the primæval timber is, except by the hand of man, most untouched. In their habits the Tarphii are strictly nocturnal, adhering to the under sides of moist decaying logs of wood, felled timber, and even stones during the day, and being only active apparently by night. From 2000 to 5000 feet above the sea may be said to include their range; nevertheless they are more peculiarly abundant from 3000 to 4000 feet, and it is perhaps towards the upper edge of these bounds that they find their maximum. * * Considering the inaccessible nature of their favorite localities it is far from improbable that many species will remain for ever undiscovered, a possibility which is not lessened by the fact either of the remarkable manner in which they are able to counterfeit death, and so elude observation, or of the near resemblance of the dull rusty colouring of their uneven and inanimate-looking surfaces to the stones, lichen and portions of rolling wood to which in the day time they remain firmly fixed." We are all aware of the creaking sound emitted by Aromia moschata and many other longicorns; we all know that this noise is accompanied by a movement of the great central articulation of the body, that of the prothorax with the mesothorax, and we all attribute the creaking to the friction of some part of the prothorax on some part of the mesothorax. Mr. Wollaston is not content with this theory, although self-evident, but has been at great pains to discover the exact truth, and has detected and described the mechanical apparatus by which the sound is produced, and tested his conclusions by producing similar sounds at pleasure and with Nature's own instruments: he finds in the genera Deucalion, Parmena and Dorcadion, a narrow space in the shape of an isosceles triangle (the apex being turned towards the scutellum), which occupies nearly the entire length of the mesonotum, and which, from its brightness, appears at first sight perfectly smooth, but when viewed under a microscope is seen to be

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covered with very fine transverse parallel and acute ridges, closely set together after the manner of a file; and it is by depressing and raising the prothorax, an act which alternately exposes and recovers the upper region of the extremely cylindrical mesothorax, that its under side is brought to play against this inner dorsal file, and by this process the stridulation is effected. "In order to convince myself," says Mr. Wollaston, "of the reality of this, I have relaxed many specimens of the genera in question, and have caused the sound artificially with the greatest ease." Although these Madeiran commentaries and quotations have already exceeded a reasonable length, I trust I shall be pardoned for making still another extract, in which the effects on insect life of a calm at sea are admirably set forth: the author is on the Northern Deserta or Ileo Chao, and is speaking of the Ptinus albopictus. "So perpetually," says he, "is that remote table rock played over by the breezes of the ocean, that even a temporary respite is almost an anomaly within its desolate area; and if such a crisis should chance at times to arrive, it is curious to note how every species of life, taking advantage of Nature's repose, comes forth to enjoy the calm. I shall not soon forget the pleasure I derived on the 5th of June, 1850, from the sudden effects of a lull, after an exposure to the blasts during several successive days, on this iron-bound isle, — how all things seemed to participate in the change, and literally to rejoice. Even the vegetation, as though released from its suffering, began to look up; whilst insects, unthought of before, filled the atmosphere as it were on the instant, as though experience had taught them that such tranquillity was but of short duration, and that if it were to be enjoyed at all not a moment was to be lost. It was on that particular afternoon that I first appreciated the prodigious numbers of the lilliputian Ptinus under consideration, which, though apparently scarce during the more boisterous period, now emerged by thousands on every side. From whence they came it would have been difficult to conjecture: * * they were in greater or less profusion everywhere, until, as evening approached and the winds began to return, as quickly as they came every one of them vanished."

With this sketch of the entomological labours of my friends—contrasting, so unfavorably to myself, with my own inactivity—I conclude this too lengthened Address: faint and imperfect as the sketch confessedly is, it still must amply suffice to show that Entomology with us is not on the wane: your exertions were never greater; they were never crowned with more triumphant success: this is a subject on which I may heartily and truthfully congratulate you, and as heartily

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and as truthfully may I congratulate you on the state of the Society, on the solidity of our present position, and on the brightness of our future prospects: we have published largely, and met with a most encouraging sale; the number of our members has increased; our exchequer is full; our debts are paid. Heartily wishing that this prosperity may continue, that every success may attend our united and harmonious labours on behalf both of the Science and the Society, I now retire from that important office with which you have entrusted me, deeply feeling that no thanks of mine can make you an adequate return for the kindness with which you have invariably received me, and carrying with me into obscurity the most pleasurable recollections of my brief tenure of authority.

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Report of the Library and Cabinet Committee for 1854.

The books are in good order; some of them, chiefly serials and pamphlets, which require binding in order to preserve them, we are about to put into the bookbinder's hands.

The library, continually augmented by donations, now contains many valuable works, and a considerable number of volumes is constantly out on loan to the Members.

The loss of the second volume of Lacordaire's 'Phytophages,' immediately after it was presented by the Author, has been already reported to the Council and announced at the October Meeting of the Society: hitherto no tidings of it have been heard, and it must be concluded that it was stolen from the room.

The insects remain in good preservation. During the past year the exotic Diurnal Lepidoptera have been arranged, and, as far as possible, named, by one of the Members of this Committee: the duplicates resulting are now at the disposal of the Council. A number of duplicates selected from the exotic Coleoptera also awaits the directions of the Council. With the above exceptions, the exotic collections remain in the same unsatisfactory state in which they have so long been,—a condition neither creditable to the Society nor just to the liberal donors of the insects. The Curator finds his time so much occupied, by his routine duties and attending to visitors, that he can do nothing in the matter, and few of the present Members of this Committee are able to devote to it the necessary time. The work required might doubtless be done by paying for it, but, considering the little interest taken by the Members generally in the foreign collections, we could not recommend such a course. As the existing state of things is constantly becoming worse, some decisive measures should be adopted, and we apprehend the only practicable plan is for the Council to request such of the Members of the Society as are conversant with the several Orders of insects, and have the requisite time at their disposal, to allow themselves to be appointed Members of this Committee, with an especial reference to the arrangement of the exotic insects. If the collections were once arranged, future additions could be put into their proper places, and the Museum would become useful to students and a credit to the Society. We, however, have reason to doubt if the Society at present possesses sufficient cabinet room to carry out this object, and it is for the Council to consider what steps should be taken in the matter.

(Signed)

EDWIN SHEPHERD.
A. F. SHEPPARD.
J. W. DOUGLAS.
EDWARD W. JANSON.

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Abstract of the Treasurer's Accounts for 1854.

RECEIPTS.

			£	s.	d.
By Balance on hand January 1st, 1854			21	13	10
„ Arrears of Subscriptions			10	10	0
„ Subscriptions for 1854			106	1	0
„ Admission Fees			14	14	0
„ Tea Subscriptions			8	1	6
„ Sale of 'Transactions' at the Rooms	£30 0 6				
„ „ „ at Longmans'	17 1 9				
			47	2	3
„ Cash of Mr. Spence, for printing Dr. Davy's Paper			3	6	6
„ „ of Mr. Curtis, for extra Engraving			„	17	0
„ Excursion Ticket not used			„	2	6
		£	212	8	7

PAYMENTS.

			£	s.	d.
To paid arrears for 1852—53:—Messrs. Ford & West ...	£2 18 3				
Mr. Westwood, for Plates	3 3 0				
Mr. Dunn, for Oil.....	2 7 8				
Messrs. Holmes & Impey, Rent to Christmas, 1854	17 10 0				
			25	18	11
„ Rent to Midsummer last			17	10	0
„ Insurance to Lady-day, 1855			2	10	0
„ Curator for attendance			17	17	0
„ „ Sundry small payments			1	3	3
„ Tea, thirteen meetings			13	0	0
„ Attendance, Coals, Cleaning, &c.			5	3	8
„ Postage, Parcels, Stationery, &c.			5	6	9
„ Printing 'Transactions,' three parts			37	15	6
„ „ 'Proceedings'			8	3	6
„ „ Plates			15	7	2
„ Colouring ditto			11	2	1
Balance in hand			51	10	9
		£	212	8	7

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Liabilities and Assets of the Society.

Liabilities.

	£	s.	d.
Mr. Westwood, for Plates ..	5	0	0
Mr. Dunn, for Oil	3	9	0
Messrs. Roworth, for printing	9	6	0
„ Day, for Plates.....	„	2	6
Rent to Christmas, 1854 ...	17	10	0
Sundries	„	12	6
	£36	0	0

Assets.

	£	s.	d.
Arrears of Subscriptions, good	18	18	0
Ditto, doubtful £4 4 0			
Ditto, bad 17 17 0			
Add balance in hand	51	10	9
	70	8	9
Less Accounts due at Xmas.	36	0	0
True Balance in favour of the Society	£34	8	9

Errata.

Page 37, line 12, *for* "cherry-tree drooping" *read* "drooping cherry-tree."
„ 40, lines 27 and 30, *for* "murinus" *read* "castaneus."
„ „ line 28, *insert a comma after* "Kuper."
„ 42, line 3, *dele* "t" *in* "Schwartzdornspinner."
„ „ line 11, *for* "readily" *read* "easily."
„ 45, line 23, *for* "this family" *read* "Staphylinidæ."

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PROCEEDINGS

OF THE

ENTOMOLOGICAL SOCIETY OF LONDON,

1855.

February 5, 1855.

JOHN CURTIS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for February; by the Editor. The 'Athenæum' for January; by the Editor. The 'Literary Gazette' for January; by the Editor. The 'Journal of the Society of Arts' for January; by the Society. 'Proceedings of the Royal Society,' Vol. vii. No. 7; by the Society. 'Report of the Council of the Art Union of London for 1854,' 2 copies; by the Art Union. 'Revue et Magasin de Zoologie,' Nos. 11 and 12, 1854; by the Editor, M. Guérin-Méneville. Specimens of the silken fabric woven by caterpillars of Saturnia pavonia-media, accompanied by figures of the insect in its different stages of growth, with a summary description thereof, and the method used to procure the silk; presented by Herr Pretsch, through Mr. Newman.

President's Inaugural Address.

The President returned thanks for his election, and delivered an Inaugural Address, which was ordered to be printed.

Vice-Presidents.

The President nominated as his Vice-Presidents J. O. Westwood, Esq., E. Newman, Esq., and H. T. Stainton, Esq.

Exhibitions.

Brigadier Hearsey exhibited a case of Lepidoptera and three cases of Coleoptera, just received from Sylhet. Among the rarer Coleoptera were pointed out Jumnos

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Ruckeri, ♂ and ♀, numerous species of Cicindelæ and Lucanidæ, Lamia Stanleyi and Buprestis Edwardsii.

Mr. Stevens exhibited three perfect specimens of the rare beetle Cheirotonus Macleayii, from India.

Galls produced by Cynips Quercus-petioli.

Mr. Stainton exhibited a bunch of galls gathered from an oak near Exeter, and of the same kind as those exhibited by Mr. Rich at the November meeting. He also read the following extract from a letter of the correspondent who had forwarded the galls:—

"Having observed, in the 'Gardener's Chronicle,' a notice of the Proceedings of the Entomological Society, in which the subject of the oak-galls of this county was spoken of, I beg to say that they are more numerous now than at any other time I have observed them. They are confined to the young and mostly the long shoots which spring from oaks which have been cut down to the ground, and to those old stumps which grow in hedges, and are subject to be cut down in repairing the hedges, perhaps once in three or four years, or it may be more. It is curious to observe that, should an oak tree stand in a hedge, it is only the lower spray which is selected by the insects: it is exceedingly rare to see a gall upon the higher branches of a tree. It may be taken as a rule that the insects never attack a tree or bush above ten feet from the ground, but the nearer the ground the more numerous the galls. Some dwarf oak pollards I saw the other day, near Stoke Wood, which had been completely denuded of their branches last winter, and of course last spring the trees produced a goodly crop of young shoots all round: to see these trees now without any leaves, and the young one-year old branches almost covered with galls like a gooseberry bush laden with fruit, is very curious and striking.

"It is rather difficult now to find any galls containing insects, for it appears that a portion of the insects make their escape in the autumn and the rest in the spring following; but the little prying tits (*Parus cæruleus*) appear to have found them out, and thousands are devoured by these birds: it is astonishing how soon they work a hole and extract the larva, which no doubt is a very dainty morsel, particularly this hard, frosty weather.

"As for the species of Cynips which causes these galls, if it is C. Quercus-petioli certainly that name was wrongly applied, for the galls on the petioles of the leaves of oak never attain that woody consistence which is peculiar to this kind of gall. I sent some of these galls, three or four years ago, to Mr. Westwood, through the 'Cottage Gardener,' asking for the name, and received for answer that it was Cynips terminalis."

Mr. Stainton pointed out that the galls now before the meeting were well figured by Réaumur,* and that no subsequent author appeared to have referred to his figures.

Indian Method of preparing the Silk of Bombyx Cynthia.

Mr. Westwood read, from the 'Journal of the Asiatic Society of Bengal,' vol. vi.,

* 'Mémoires' tome iii. 452, pl. 41, figs. 7—15.

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brought by Brigadier Hearsey, the following account of the method used in India to prepare the silk from the cocoons of Bombyx Cynthia:—

"The cocoons are put over a slow fire, in a solution of potash, when the silk easily comes off: they are taken out, and the water slightly pressed out; they are then taken one by one, loosened at one end, and the cocoon put over the thumb of the left hand; with the right they (*sic*) draw it out nearly the thickness of twine, reducing any irregularity by rubbing it between the index and thumb: in this way many cocoons are joined on. The thread is allowed to accumulate in heaps of a quarter of a *sur* (*sic*); it is afterwards exposed to the sun or near the fire to dry; it is then made into skeins, with two sticks tied at one end, and opening like a pair of compasses: it is then ready to be woven, unless it has to be dyed."

Mr. Newman read the following note, intituled

"*A Word for the Cockroach.*

"'There is nothing new under the sun:' so says the proverb. I believed, until a few days back, that I possessed the knowledge of a fact in the dietary economy of the cockroach of which entomologists were not cognizant, but I find myself forestalled; the fact is 'as old as the hills:' it is that the cockroach seeks with diligence, and devours with great gusto, the common bed bug. I will not mention names, but I am so confident of the veracity of the narrator that I willingly take the entire responsibility. 'Poverty makes one acquainted with strange bed-fellows,' and my informant bears willing testimony to the truth of the adage: he had not been prosperous, and had sought shelter in a London boarding-house: every night he saw cockroaches ascending his bed-curtains; every morning he complained to his very respectable landlady, and invariably received the comforting assurance that there was not a 'black beetle' in the house: still he pursued his nocturnal investigations, and he not only saw cockroaches running along the tester of the bed, but, to his great astonishment, he positively observed one of them seize a bug, and he therefore concluded, and not without some show of reason, that the cockroaches ascended the curtains with this especial object, and that the minor and more odoriferous insect is a favourite food of the major one. The following extract from Webster's 'Narrative of Foster's Voyage'* corroborates this recent observation, and illustrates the proverb which I have taken as my text:—'Cockroaches, those nuisances to ships, are plentiful at St. Helena; and yet, bad as they are, they are more endurable than bugs. Previous to our arrival here, in the Chanticleer, we had suffered great inconvenience from the latter, but the cockroaches no sooner made their appearance than the bugs entirely disappeared: the fact is that the cockroach preys upon them, and leaves no sign or vestige of where they have been: so far it is a most valuable insect.'"

Coccus arborum-linearis, Geoff.

The President read the following extract of a letter from Dr. A. Fitch:—

"My esteemed friend,—I take the liberty to enclose to you some pieces of bark covered with the scales of a Coccus which is making appalling havoc in the orchards

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* 'Foster's Voyage,' Vol. i. 373.

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of Illinois and Wisconsin, and is abundant in my own neighbourhood. I have supposed this to be the Aspidiotus linearis (Coccus arborum-linearis, *Modeer, &c.*), but have at hand no good description of that species, and am not without suspicions that it may be your A. Ostreæformis or conchiformis, these names being far more applicable to these scales than is that of linearis. As this insect will be embraced in the Report on insects injurious to fruit trees, which I am now preparing (for the New York State Agricultural Society, pursuant to directions of the State Legislature), I wish to be more certain with regard to its true name. A word from you, in reply to my inquiry, will be very gratefully received."

The President exhibited the insects *in situ:* they were the Coccus arborum-linearis, *Geoff.*, and the C. conchiformis he believed of Gmelin. The President remarked that "It is a subject for congratulation that these matters are being taken up by the State, and, from the valuable work of Dr. Harris having reached a second edition, it is evident these important objects will in future not be neglected in the United States."

Proposed Monograph of Elateridæ.

The President said M. Candeze of Liege, one of the authors of the 'Catalogue des Larves des Coléoptères,' had written to him to make known his intention of publishing a complete Monograph upon the Family Elateridæ, which he estimates at 3000 species. He solicits the assistance and cooperation of the entomologists of this country, by the loan of specimens, especially those of the East Indies and Australia. Most of the professors in the different cities of Europe have promised to lend him specimens for description, which he undertakes to return speedily.* He is one of the pupils of Professor Lacordaire, to whom the Catalogue is dedicated; and the President will be happy to transmit to him any specimens which the Members are willing to send him, provided they be entrusted before the end of February, when his friend will leave London.

Note on Psyche helicinella.

Under this title Mr. Douglas read the following remarks:—

"More than a century ago Réaumur, in his 'Mémoires,'† recorded the discovery of some curious heliciform cases, which he believed to be those of the larvæ of a moth, although he reared from them only 'une petite mouche noire et à quatre ailes,' which Siebold thinks must have been a Chalcis parasitic on the larva.

"Professor Siebold,‡ in a notice of the recent discovery by several entomologists of helical cases, which he regards as identical with those mentioned by Réaumur, states the curious fact that none of the finders thereof, nor any other entomologists, had up to that time had the good fortune to rear from any of these cases a winged Lepidopterous insect, but either a Chalcis, a Pteromalus, or a vermiform female like that of a Psyche, which Siebold named provisionally P. helix.

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* England, he writes, has not responded to his appeal in the name of Science, which has been made to the Entomological Society of London through Mr. Westwood. His first volume will appear at the end of the summer, and he especially wants the genera Agrypnus, Campsosternus, Hemops and Crepidomenus.

† Tome iii. Part 1, 12mo, p. 249.

‡ Trans. Ent. Soc., Vol: i. n. s., page 238.

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"Herrich-Schäffer described and figured* a Psyche helicinella, male, from specimens sent from Sicily by Mann, who only suspected they had escaped from spiral cases which he found in the vicinity of their capture.

"Bruand† has described and figured a Psyche helicinella, male, but does not state that he ever identified the perfect insect with the case. On the contrary, speaking of the inhabitant of the helical cases, he says that 'the caterpillar is difficult to rear; and for my part, after three unsuccessful attempts, I have ceased trying to obtain the imago in captivity. It is probable that some atmospheric conditions (the morning dew for example) are necessary to its coming forth. The caterpillar fed quite well up to the time of its transformation, then it commenced to wander about in the vase or box in which it was placed, and at length fixed itself near the partition; . . . then nothing came out—it died miserably.' Neither does he state that he has reared the male from the *pupa* found in the natural habitat, so that it may be inferred he also figured the insect from captured specimens.

"Lastly, M. Nylander has recorded‡ that he raised from a helical case which he found in 1853, in the South of France, a male Psyche.

"Whether the spiral cases, seen by so many observers, all belong to one species of larva is not certain, but, assuming that they do, it would seem that M. Nylander has been the first to rear the male insect, which he refers to Psyche helix, *Sieb.* = P. helicinella, *H.-S.*

"The larvæ inhabiting these spiral cases appear to be polyphagous, having been found on Cheiranthus odoratum (*Vallot & Tarnier*), Teucrium Chamædrys (*Bruand*), Anthyllis vulneraria, Lotus corniculatus, Gnaphalium arenarium and olive-trees (*Zeller*), Atriplex laciniata (*Kollar*), and Artemisia vulgaris (*Reutti*).

"I have thought it worth while to collate and bring these facts before the Society, as I think it probable, judging from the wide range of the species (it being generally distributed in Italy, France and Germany), that it may be found in this country, if our collectors know what to look for. There also attaches to the species another consideration of interest, it being one of those insects of which fertile eggs are constantly laid without the intervention of the male, as affirmed by Siebold and Reutti.

"I avail myself of this opportunity to remark that out of the eighty-two species of Psychides enumerated by M. Bruand, only ten or eleven have yet been detected in Britain. When we remember that of this latter number two§ are not known on the Continent, I cannot but think that we have to find in this country some of the continental species, and probably some more not yet recognised abroad."

Descriptions of Lucanidæ.

Mr. Westwood read a paper descriptive of many new species of Lucanidæ, illustrated with figures of the insects described.

New Part of the 'Transactions.'

Part 3 Vol. iii. of the 'Transactions,' published in January, was laid on the table.

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* System. Bearbeit., Bd. ii. figs. 108, 109.

† 'Essai Monographique sur la tribu des Psychides,' p. 73.

‡ 'Annales de la Soc. Ent. de France,' 1854, p. 336.

§ P. reticella, *Newm.*, and P. inconspicuella, *Stainton* (M. Bruand assigns both these names to Mr. Curtis).

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March 5, 1855.

JOHN CURTIS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Genera des Coléoptères ou Exposé Méthodique et Critique de tous les Genres proposés jusqu'ici dans cet ordre d'Insectes,' par M. Th. Lacordaire, Tome ii.; presented by the Author. 'Bericht über die Wissenschaftlichen Leistungen im Gebiete der Entomologie während des Jahres, 1852,' von Dr. Herm. Schaum; by the Author. 'Geodephaga Britannica,' by J. F. Dawson, L.L.B.; by the Author. 'List of the Specimens of Dipterous Insects in the British Museum,' part 6, supp. 2, by Francis Walker; by the Author. 'Journal of the Royal Agricultural Society of England,' Vol. xv., part 2; by the Society. 'Proceedings of the Royal Society,' Vol. vii., No. 8; by the Society. 'Journal of the Society of Arts' for February; by the Society. 'The Literary Gazette' for February; by the Editor. 'The Athenæum' for February; by the Editor. 'The Zoologist' for March; by the Editor. 'Magazin des Thierreichs,' Erster Band; by John Curtis, Esq. 'Notes on four Galls from the Crimea,' by John Curtis, Esq., F.L.S. (from the Gardeners' Chronicle); 'On the Genus Myrmica, and other indigenous Ants,' by John Curtis, Esq., F.L.S., and 'Remarks relative to the Affinities and Analogies of Natural Objects, more particularly of Hypocephalus, a Genus of Coleoptera,' by John Curtis, Esq., F.L.S. (both papers from the Transactions of the Linnean Society); all by the Author. 'Insecta Saundersiana; Coleoptera, Curculionides,' by H. Jekel; by W. W. Saunders, Esq.

Exhibitions.

Mr. Stevens exhibited a quantity of insects of all orders, including several fine new species, being part of the collection made by Madame Pfeiffer, at Amboyna and Ceram. Among the butterflies were the true Ornithoptera Priamus ♀, O. Panthous and O. Amphimedon, *Cramer*. The Lepidoptera came packed between sheets of paper, and the other orders loose in layers between paper and cotton, not pinned; and all had travelled quite securely.

Mr. Edwin Shepherd exhibited a specimen of Arctia Caja, from the collection of Mr. Allis, having the left upper wing marked with two nearly parallel streaks of the same colour as the under wings, crossing the other colours of the wing from the base to the posterior margin. He likewise exhibited, from the collection of Mr. John Scott, a specimen of Triphæna orbona, of which the upper wings were much shortened and the colour was nearly black, the anterior margin being suffused with red. This remarkable variety was taken in Scotland.

Mr. Edward Sheppard exhibited a silken bag of a slight, flossy texture, being one of the kind imported from China as coverings to the ends of the hanks of silk in bales. Dr. Gray said he was informed by Mr. Reeves that each of these bags was only a single cocoon beaten out.

Prize Essay for 1855.

The President announced that the subject proposed for the Prize Essay of the Society this year was the Coccus producing the lac-dye of commerce, towards which,

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as announced last year, Dr. Royle had promised the assistance of all the information on the subject possessed by the East India Company to any one who would undertake the Essay.

Proposed Catalogue of British Coleoptera.

The Secretary stated that a proposition had been made to the Council that the Society should print a concise Catalogue of British Coleoptera, to facilitate the exchange of specimens among collectors, and thus lead to a rectification of the synonymy. The Council, although aware that at present such a list must be imperfect, were disposed to give the proposition a favourable consideration provided they were assured of support, and they invited communications on this point from Coleopterists generally.

Mr. Westwood thought, that by the united labours of our Members this desirable work might be accomplished.

Dr. Gray said he had long tried to get a Catalogue of British Coleoptera made, but in vain; he was still ready to print one, and to pay the author.

Habits of Eastern Butterflies.

Mr. Newman called the attention of the Meeting to a paper, by Mr. Wallace, 'On the Butterflies of Sarawak,' which appeared in the March number of 'The Zoologist.' The passages to which he referred were as follows:—"The handsome green and blue spotted butterflies, Papilio Agamemnon, &c., fly with the greatest rapidity of any Papilios: the eye can scarcely follow them; in fact they much resemble in habit the humming Sphinxes, and hover over flowers, or more frequently over damp places on the ground, with a constant vibration of the wings. * * * Papilio Iswara, and another species allied to P. Helenus, but I think new, have an undulating flight, very like that of the South American Morphos, or even sometimes approaching that of the large Noctuidæ, and they rest with the upper wings deflexed over the lower." Mr. Newman thought both these facts, the hovering like Sphinxes, and the resting with deflexed wings, extremely interesting: it would be within the recollection of many entomologists that Mr. Swainson and the late Mr. Edward Doubleday had urged the latter character as a reason why Castnia should be united to the Sphingidæ: with this new evidence before us, we may perhaps agree to the conclusion of these eminent Lepidopterists, but we must demur to the reasoning, because if Castnia were a Sphinx only on the ground that it possessed the character of resting with deflexed wings, then Iswara were a Sphinx also. On mentioning this subject to Mr. Adam White, the original describer of Papilio Iswara, and a gentleman whose entomological knowledge is all but universal, he obligingly showed Mr. Newman specimens of allied Papilios preserved, in the matchless collection of the British Museum, with their wings in the position described by Mr. Wallace.

South African Honey-bee.

Under this title Mr. Newman read the following memorandum:—

"I believe it is generally supposed that one particular species of bee is entitled to the name of 'honey-bee,' because the only one that in this country produces honey in sufficient quantity to be serviceable to man; but there are several others.

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A friend, writing from the Cape, mentions a honey-bee which is even more productive than ours; he describes it as very small, scarcely half the size of Apis mellifica, and very fond of domiciliating in outhouses, and otherwise attaching itself to the homesteads of man. I expect to receive specimens, and shall have much pleasure in handing them to Mr. Smith for examination. Mr. Webster, in his graphic narrative of the 'Voyage of the Chanticleer,' also writes thus on visiting the farm-house of a Dutch boor:—'The first thing that attracted my attention was a swarm of bees that had attached themselves to the parlour-window, occupying the space between the shutter and the glass. On inquiring about them, I found that they had taken a liking to the situation for several years. * * * After the fear of being stung by them was got over, I contemplated the labours of these little creatures with much pleasure, and they frequently afterwards occupied my attention. They are much smaller than our bees, and appeared to be far less irritable, and I was informed that they work during the whole year. They kept the house well supplied with honey, the comb being taken away about eight times during the course of the year, or about every six weeks. The hexagonal form of the cells did not seem to be the result of pressure, and were all of the same form, both at the top and sides. In the course of my observations of them, I frequently saw them removing a portion of wax from one part of the comb to another.' These proofs of the existence of so profitable a honey-bee in the Cape Colony, appear to me very interesting. Mr. Webster's observation about the figure of the cells reminds me of an idea that I carried out three years ago: I obtained a cake of bees' wax and perforated it with circular holes as near as possible together, and afterwards, with a sharp penknife, reduced the walls to the greatest tenuity they would bear without breaking; the result was the formation of closely approximated hexagons, a good deal resembling those made by the bees; but of course much larger and much less regular: I believe the experiment was suggested by a note written years ago by Mr. Waterhouse,* but it seems to imply that the hexagonal form is almost an inevitable result of two grand objects of Nature,—economy of space, and economy of material,—and does not prove the existence of that reflecting power which some have claimed for the bee."

A new Enemy to the Honey-bee.

Under this title Mr. Newman read the following note:—

"You will probably recollect my mentioning some months back, on the authority of Mr. Lucas, a fact which I thought new, that of a fat toad squatting himself on the alighting-board of a bee-hive, watching for the bees and swallowing them one after another as they returned home at night after the labours of a long summer's day. The statement was received with evident distrust: I particularly remember our friend Mr. Hudson thought it impossible for a toad to climb to such a position, and a learned apiarian, a namesake of my own, wrote a reply showing that such an assertion was totally unworthy of serious consideration, and evidently comforted himself in believing he had totally extinguished this supposed new light in bee history. However, there is another glimmer from the same lamp, and exhibited quite incidentally and *à propos* to another anecdote. My informant is Mr. Charles Muskett, of Norwich.

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* Trans. Ent. Soc. III. Proceed. p. xii.

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'It is, no doubt, well known,' says Mr. Muskett, '*that the common toad will sit at the entrance of the hive and devour the bees one after another as they come within reach of his tongue;* but a rather singular circumstance occurred a few days since in this neighbourhood; it was witnessed by my brother, and I can vouch for the fact: during the late severe weather, happening to be occupied in the garden, he heard a tapping noise in the direction of the bee-house, and on directing his attention to the spot, observed a woodpecker (*Picus viridis*) drop down on the block and devour the bees as fast as they made their appearance. My brother had previously noticed that the bees diminished in number, and could not account for it: on examining the hive he found the mortar had been pecked away, so that more light was admitted."

Mr. Westwood remarked that the fact that toads were enemies to bees was new and interesting, and he would take this opportunity to mention, as a circumstance that had come under his own observation, and one that he had not seen published, that the common sparrows ate honey-bees with avidity, but only at a certain period of the year, namely, in July, when they had young ones to provide for and there was a lack of their usual food.

On Greasiness in Insects.

Mr. Douglas read the following note:—

"In his Monograph of the Genus Depressaria, published in the 9th vol. of the 'Linnæa Entomologica,' Professor Zeller, in a note under D. ultimella, says he could not distinguish the examples of that species received from Mr. Stainton, on account of the greasy condition of their bodies; and he further remarks, that the greater prevalence of greasiness in English collections, compared with those of Germany, is due to the use of camphor in English cabinets. I have heard this idea before, but esteemed it only as the dictum of an individual; for we often find certain species get greasy even before they are removed from the setting-boards, and this remark applies especially to those Lepidoptera which, in their larva state, are internal feeders. In the cabinet it is almost invariably internal feeders, both Lepidoptera and Coleoptera, which first become greasy. Yet it is perhaps worth while to ask some of our chemical friends to tell us whether there is any foundation for the opinion that the odour of camphor has any influence in developing greasiness in preserved specimens of insects.

"The Germans, I am informed, use quicksilver to keep away mites, and it might be asked, in addition to the question just proposed, whether its presence in the insect-drawers has any influence in preventing the appearance of grease in the specimens. As in Germany it is the practice to mount insects high up on the pins, there is no difficulty in the use of quicksilver, but with us it would be far different, for, as the wings of our Lepidoptera touch the paper, the globules would roll over and destroy them,—that is, if the method of placing it loose in the drawers, as used in Germany, were adopted.

"In France they appear to use no preservative at all, if we may judge from the condition in which specimens of Lepidoptera have been returned to this country; and we know that the fine state of preservation of our collections has excited the admiration of French Lepidopterists.

"For the injury to insects by greasiness, camphine is an effectual remedy; simple immersion therein, however, is not sufficient to prevent the recurrence of greasiness; the specimens should remain in the spirit for several days.

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"In old and neglected specimens the pins become quite corroded by verdigris: to prevent the occurrence of this, a method is used in Germany, of which I was informed by Mr. Dohrn: it consists in pushing the pin further through the insect than it is intended to remain, covering the portion immediately below the insect with a solution of gum arabic, and then drawing back the pin, which, by the coating it has received, is preserved from the action of the grease. The same principle has recently been applied in this country, by electro-plating the pins; and it is likely to be of use for those species in which the pin becomes corroded, and yet the grease does not much affect the insect: but the expense of these pins will prevent their general adoption."

Mr. Edward Sheppard said he had found the use of electro-plated pins check the growth of verdigris in greasy insects.

Mr. Edwin Shepherd said he had tried pins doubly-gilt, and yet in some instances he found they were acted on by the grease of the insects. He thought that when the bodies of insects rested on the paper they were more liable to become greasy than when the insect was elevated on the pin, as in the continental method.

Mr. Waterhouse said one great cause of greasiness was the placing insects in the cabinet soon after they were captured.

The President said that in the continental cabinets, where quicksilver was used, it was confined to grooves in the bottom of the drawers.

Captain Cox said that so long as he kept his insects in London none of them were greasy, but having removed them into the country, near to a running stream, forty or fifty of them have become greasy, and this effect he attributed to the moisture of the atmosphere of the place.

Mr. Janson read the following two notes by Dr. H. Schaum, of Berlin:—

On Heterorrhina bicostata, Westwood.

"Mr. Westwood has lately given, in the 'Transactions' of this Society, New Series, iii. p. 66, some details and a drawing of an African Heterorrhina, which he considers to be the H. bicostata, published by me in the fifth volume of the 'Transactions,' p. 65. He asserts that the unique specimen described by me, is in Captain Parry's collection, and that his drawing had been taken from that specimen.

"I beg to state that this assertion is not correct, but that my specimen was from the cabinet of the late Mr. Melly (as indicated by me l. c. p. 65), and is now in the possession of his son. I mention this, because a comparison of Mr. Westwood's figure with my description leads me to the opinion that the H. bicostata of Mr. Westwood is specifically distinct from the insect published by me.

"The following differences seem to exist between the two insects: in the typical specimen of Heterorrhina bicostata of Schaum the thorax is unusually small; the mesosternal part of the sternal process short; the four posterior tibiæ deeply sulcated inside; while in the specimen figured by Mr. Westwood the thorax is of the usual size, the mesosternal process long, and the four posterior tibiæ without furrows on the inside. Furthermore, the anterior tibiæ are simple in Mr. Melly's specimen, while they are armed beyond the middle with a broad, though obtuse, tooth, in Captain Parry's insect. On this last difference I lay, however, but little stress, as it may arise from the two specimens belonging to different sexes. For, though Mr. Westwood designates his specimen as a male, I am inclined to draw from his own words the con-

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clusion that it is a female. The presence of a tooth on the outside of the anterior tibiæ would itself be quite an anomalous character in a *male* of a green African Heterorrhina, and the indication, that the abdomen has "a *slight* oblong-oval *impression*," seems as little to support Mr. Westwood's opinion, for in all other species the abdomen of the male shows a *broad* and *deep furrow* along its middle.

"It might seem ludicrous for me to discuss the sex of an insect, which I have not seen, and I would certainly have refrained from doing so, if I had not compared in the Royal Museum, at Berlin, a specimen taken in Mosambique by Dr. Peters, which I suppose to be the male of Mr. Westwood's insect. It agrees well with the figure of the latter, except that it is considerably smaller, that the anterior tibiæ are unarmed, the tarsi longer, and the abdomen with a deep excavation in its middle. These are, however, differences, which, in the genus Heterorrhina distinguish the males from the females.

"If my supposition prove to be correct it will become necessary to bestow another name on Heterorrhina bicostata of Westwood.

Remarks on Mr. Curtis's recent Descriptions and Figures of British Elateridæ.

"The descriptions and figures of some British *Elateridæ*, published by Mr. Curtis in the 'Transactions' of this Society, New Series iii., p. 10, enable me to point out under what names most of these species have been described by continental authors.

"Ectinus? gagates, *Curt.*, is undoubtedly Ampedus lugens, of Redtenbacher and Germar, as stated already by Mr. Janson in the 'Entomologist's Annual' for 1855, p. 98.

"N. G.? punctolineatus, *Curt.*, is perhaps Ampedus scrofa, *Germ.*, though I have never seen a specimen of the latter which attains the size given by Mr. Curtis, and in which the smooth line down the centre of the thorax, mentioned by Mr. Curtis, is well marked.

"Elater nigrinus, *Curt.*, seems better to agree with Ampedus obsidianus and brunnicornis, *Germ.* (which are varieties of the same species as recognised by Germar himself) than with the true Amp. nigrinus, *Payk.*, *Gyll.*

"Aplotarsus maritimus and Cardiophorus formosus, *Curt.*, are unknown to me. Should not the latter be regarded as a foreign insect accidentally introduced into England?

"Aplotarsus? cothurnatus, *Curt.*, is in all probability Ampedus subcarinatus, *Germ.*

"I take advantage of this opportunity to state that the Lathrobium carinatum, *Bold.* figured in the 'Entomologist's Annual,' is angusticolle, *Er.*"

Observations on British Elateridæ.

Mr. Janson also read some observations, by himself, on the British Elateridæ, alluded to by Dr. Schaum.

M. Henri Jekel communicated, through Mr. Waterhouse, the following

Note on Omias sulcifrons.

"A very interesting fact for the British Fauna should be the increase of a genus in the family Curculionidæ (though adding no new species), if sufficient generic differences were to be found.

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"M. Jacquelin Du Val has shortly described and figured in his 'Genera des Coléoptères d'Europe,' page 13, plate 10, fig. 21 bis et 21 bis A, under the name of Barypeithes rufipes, an insect which is nothing but the Omias sulcifrons, *Sch.*, t. vii. pars 1, page 143, a species, as far as I am informed, only found, until the present time, in England, but now also pertaining to French-Britain's Fauna, the specimens in the collection of M. Chevrolat having been caught in the neighbourhood of Brest; no unusual fact, for I have received from M. de Léséleuc, who resides in the Department du Finestère, several species, which had been recorded as British only before his investigations. The national name of British is then not the only point of resemblance between the two countries.

"The value of M. Jacquelin Du Val's generic characters, as well as the place he gives to this insect (which, in my opinion, should be connected with Omias), I propose to discuss in my next note. I venture to say at present, that both the description and the figure do not permit one to recognise the insect, and I have to add that Boheman's description in Schönherr (loc. cit.) is perfect."

April 2, 1855.

JOHN CURTIS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Abhandlungen der Mathematisch-Physikalischen Classe der Königlich Bayerischen Akademie der Wissenschaften,' Vol. xvii. Part 2; 'Bulletin der Königlich Akademie der Wissenschaften,' Nos. 1—52, 1853; 'Ueber das Klima von München,' von Karl Kuhn; by the Academy. 'The Literary Gazette' for March; by the Editor. 'Journal of the Society of Arts' for March; 'Catalogue of the Seventh Exhibition of Inventions;' both by the Society of Arts. 'Proceedings of the Royal Society,' Vol. vii. Nos. 9 and 10; by the Society. 'The Zoologist' for April; by the Editor. 'Proceedings of the Berwickshire Naturalist's Club,' Vol. iii. No. 5; by the Club. 'The Entomologist's Annual for 1855,' 2nd Edition; by the Editor. Hewitson's 'Exotic Butterflies,' Part 14; by W. W. Saunders, Esq. 'Entomologische Zeitung,' 1855, Nos. 1 and 2; by the Entomological Society of Stettin. Fifty-two specimens of British Lepidoptera; by H. Doubleday, Esq.

Distribution of the Society's Duplicate Insects.

The Secretary announced that the Council had determined to distribute among the Members the duplicate specimens in the Society's collection of British Coleoptera, Exotic Coleoptera and Exotic Diurnal Lepidoptera; and that, in order to give the country Members an opportunity of selection, the distribution would not take place until after the June meeting. The Council did not make any condition of exchange, but they hoped the Members would, in return, contribute as far as they were able the desiderata to the Society's collection.

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Proposed Catalogue of British Coleoptera.

The Secretary also said he was happy to announce that the offer of Dr. Gray for a Synonymic Catalogue of British Coleoptera had been accepted by our Curator, Mr. Janson, who would be glad to receive any information and assistance from his brother Coleopterists in the work he had undertaken. The first part of the Catalogue would be ready in about two months, and it was also Mr. Janson's intention eventually to print a Nomenclature of the Species, for interchange among collectors.

Exhibitions.

Mr. Foxcroft sent for exhibition specimens of several species of Lepidoptera, recently reared by him from larvæ collected in Fifeshire; a pair of each species would be given to each of his subscribers for Lepidoptera: also two specimens of Papilio Machaon, with the skins of the chrysalides from which they came: both insects and pupæ, he said in a note, presented certain constant differences of marking divisible into two kinds, of each of which he had reared males and females.

Mr. Bond exhibited a Phragmatobia Menthrasti, presenting an agglomeration of the dark spots on the costa into a continuous line, and also some other variations of marking. This specimen was reared by Mr. Foxcroft.

Mr. Stevens exhibited, from the collection of Madame Pfeiffer, a pair of the rare beetle Euchirus longimanus.

Greasiness of Insects.

Mr. Stainton exhibited two specimens of Nepticula Acetosæ, pinned last summer, which already showed signs of verdigris on the pins.

Mr. Edward Sheppard exhibited four specimens of a Donacia, two of which were mounted on gilt and two on ungilt pins. They were all pinned at the same time, four months ago, and the gilt pins exhibited no trace of verdigris, but the ungilt pins were surrounded with it.

Mr. Edwin Shepherd repeated his former remark, that after the lapse of a year or more he had found pins doubly gilt were affected by the greasiness of some insects equally with ungilt pins.

Description of a New Ornithoptera.

Mr. Stevens read a description, by Mr. Wallace, of a new butterfly taken by him on the N. W. coast of Borneo, under the name of Ornithoptera Brookiana, of which a drawing was exhibited.

Tropical Micro-Lepidoptera.

Mr. Stevens read an extract from a letter received from Mr. Wallace, in Borneo, in which he stated that he had taken about 700 Micro-Lepidoptera, among which are some extraordinary developments of palpi, &c. He finds these small moths come in abundance to a lamp, on dark, wet nights, and in the wet season he is sure he could get thousands of them.

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The President read the following note:—

On the Galls produced by Cynips Quercus-petioli.

"When, at the last Meeting of the Society, I presented my observations upon various galls from the Crimea, lately published in the 'Gardener's Chronicle,' I had no opportunity of referring to the oak-galls which have been several times exhibited to the Members under different names.

"It is, however, most important that the name of the species should be determined; I therefore investigated the subject carefully, and am satisfied that I was correct in the opinion I first gave. It may be remembered that when the galls, with the fly, from Mr. Walcott, were laid before the Society by me, and also by Mr. Rich, I stated they were identical with the Cynips Quercus-petioli of Linneus, but this opinion was objected to by Mr. Newman, owing to the galls not being apparently produced from the petioles.

"On referring to Linneus's 'Fauna Suecica,' p. 387, I find he writes of Cynips Quercus-petioli, 'Habitat in Galla utrinque convexa inflata, petioli seu ramuli Quercus,' showing that the galls are not confined to one spot, and he refers to Roësel's Ins. App. t. 35, 36, which volume I had obtained of Mr. Janson at the last Meeting, in order to exhibit the excellent plate of the galls there given, together with the imago, which agrees well with the females bred by Mr. Walcott, at once identifying the galls and insects which I exhibited last November with the Cynips Quercus-petioli of Linneus, and likewise with Reaumur's fig. 7, pl. 41, vol. iii., which evidently represents the galls of the same species of Cynips.

"I would also observe that the 'Galle en pomme,' represented in the same plate by Reaumur, and formed by the Cynips Quercus-terminalis, is so totally different from the galls of the C. Quercus-petioli in the internal structure, as well as in their position on the twigs of the oak, that they must be the productions of very different species.

"Since the above memoranda were written I see Mr. Westwood has given, in the 'Gardener's Chronicle,' an Essay on the British Ink-Galls, with figures of the oak-gall and the Cynips from Devon; and I am glad to learn he intends to investigate still further the galls of commerce. It is possible they may not be found so valuable, in a commercial point of view, as they were formerly, owing to the galls being superseded by metallic ingredients in the manufacture of ink; nevertheless they may still be serviceable in furnishing a permanent dye."

Mr. Westwood said he had very recently found his specimens of the Cynips, which he had determined to be the C. Quercus-petioli so long ago that the ink with which the name was written on the label had faded.

Duration of Life in the Honey-Bee.

Read, "Observations on the Honey-Bee, in continuation of the Prize Essay of the Entomological Society for 1852;" by J. G. Desborough, Esq.

Mr. Wollaston's Collection of Madeira Insects.

Dr. Gray said it might be interesting to the Members to know that Mr. Wollaston had transferred to the British Museum his collection of Madeira Insects.

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May 7, 1855.

John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Proceedings of the Royal Society,' Vol. vii. No. 11; by the Society. The 'Athenæum' for March and April; by the Editor. The 'Literary Gazette' for April; by the Editor. The 'Zoologist' for May; by the Editor. 'List of Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part ii., Lepidoptera-Heterocera; by F. Walker, Esq. 'A List of the British Species of Geodephaga intended for marking Desiderata and Labelling Collections, taken from Mr. Dawson's Geodephaga Britannica,' by G. Guyon; two copies, by the Author. 'Annales de la Société Entomologique de France,' 3me Série, Tome ii., 4me Trimestre; by the Society. 'Verhandlungen des Zoologisch-Botanischen Vereins in Wien,' Band iii. 1853, Band iv. 1854; by the Society. 'Entomologische Zeitung' for March and April, 1855; by the Entomological Society of Stettin. Trachodes hispidus, one specimen; by F. Plant, Esq., of Leicester. Trachodes hispidus, one specimen; Lina æsea, two specimens; Callistus lunatus, two specimens; by F. Bates, Esq., of Leicester.

Exhibitions.

Mr. Crewe exhibited two specimens of Notodonta cucullina bred from the eggs.

Mr. Stevens exhibited six specimens of Notodonta carmelita reared from the eggs; also five specimens of Aleucis pictaria, taken within the last week at Dartford Heath.

Mr. Foxcroft sent for exhibition three specimens of Endromis versicolor, taken by him in the birch wood, Fincastle, Perthshire, on the 18th of April.

The Rev. W. H. Hawker exhibited a specimen of the very rare Cloantha perspicillaris, taken in a spider' web at Ashford, Hants; and two specimens of Argynnis Lathonia, captured in that locality.

Mr. Stevens exhibited a Dicranocephala, taken in China by Mr. Fortune, which was thought to be distinct from D. Wallichii.

Mr. Newman exhibited three species of the Australian genus Deretaphrus, described in the Appendix to the 'Zoologist,' p. 207, all of them remarkable for the excavation in the prothorax, from which the genus received its name: he added that an admirable description and summary of the characters of this curious genus, from the pen of that accomplished Coleopterist, Mr. Wollaston, was prefixed to the descriptions of the species.

Mr. Newman also exhibited two beautiful specimens of that rare Australian beetle, the Diphyllocera gemellata of Westwood, admirably described and figured in our 'Transactions,' vol. i. p. 214, and tab. xxii. fig. 1. They have been most obligingly placed in Mr. Newman's hands by Mr. James Gibbon, together with an immense number of rarities and novelties collected by himself at Moreton Bay.

Mr. Newman also exhibited the unique specimen of Dohrnia miranda, one of the Australian Œdemeridæ, described by him at p. 133 of the Appendix to the 'Zoologist:' he wished particularly to invite attention to the perfectly anomalous structure of the antennæ of this insect.

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Remarkable variety of Cynthia Cardui.

Mr. Newman also exhibited a specimen of Cynthia Cardui, showing a remarkable aberration from the normal colouring: it was taken on the 8th of September, 1851, at St. Lawrence, in the Isle of Wight, by Mr. George Ingall, who most obligingly placed it in Mr. Newman's hands, and enabled him to draw up the following brief description, which appeared at the time at p. 3304 of the 'Zoologist,' but the insect never having been exhibited to the Society, Mr. Newman thought it might be interesting:—

"*Upper side: fore wings.*—In examples of Cynthia Cardui in its normal state, the entire apical area is of a deep brown colour, approaching to black, and adorned with certain white markings, the chief of which is a large oblong white blotch, situated at about two-thirds of the costal margin, to which its upper extremity is closely approximate; beyond this are four subrotund white spots disposed in an irregular series, the first and fourth being considerably larger than those which are intermediate, and again, beyond these, and still nearer the apex of the wing, is a sinuous series of five slender white lunules: in the aberrant example the large white mark, as well as the lunules, are entirely absent; the four subrotund spots are present, but altered in form, and having indistinct and suffused limits: the lowest of the four is increased to treble its normal dimensions, and united to an equally large and similarly shaped white spot in the adjoining areolet, and again, in the next areolet, *i.e.*, the one still nearer the anal angle of the wing, is still another smaller round white spot: in normal specimens the fulvous discoidal area is blotched with very dark amorphous patches, in the aberrant example these are entirely absent, the discoidal area being uninterruptedly fulvous: in the normal state the black border of the anal portion of the external margin is of an intense dark brown, in the aberrant example it is much paler, and increased to double its usual width. *Upper side: hind wings.*—In normal examples of this species there is an interrupted band of dark brown markings across the discoidal area; nearer the exterior margin is a series of five round black spots, one in each of the open areolets, with the exception of that nearest the anus; again, beyond this is a series of six elongate black lunules, one in each open areolet: in the abnormal example, all these markings are absent but nearly on the site of the five round black spots are five round pure white spots, of which that nearest the anal angle has an indistinct brown ocellus. The black marginal markings which, in the normal state, have been described as hastate, are in the aberrant example suffused and considerably altered in appearance. *Under side.*—This partakes, in a great degree, of all the remarkable aberrations noticeable on the upper side, but, in addition, the entire under surface has a washed or suffused appearance, all the distinctness or sharpness, so to speak, of the usual exquisitely beautiful marbled markings being obliterated."

Athous campyloides.

Mr. Newman also exhibited the three specimens of Athous campyloides taken by that indefatigable collector, the late Mr. Robert Foster, on the blossoms of elder, at Ramsgate, and described at p. 509 of the first volume of the 'Entomological Magazine.' Mr. Newman had lately submitted the specimens to the critical

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examination of Mr. Janson, and he believed no one understood our British Elateridæ so thoroughly, and Mr. Janson pronounced the species to be perfectly distinct from any other British Elater with which he was acquainted. The specimens are two males and one female; they differ considerably in size and colour, but evidently belong to the same species. Mr. Newman remarked that the time and locality were very inviting to out-of-door entomologists, and he hoped to incite some of his brethren of the net to a further search: the species, he observed, was probably Continental, as well as insular, but he knew of no other description than the one to which he had alluded. He added that, since he had been in the room, Mr. Dawson had shown him a specimen taken also at Ramsgate.

Death of Dr. De Haan.

The Secretary announced that the Council had been informed of the death of Dr. De Haan, one of the Honorary Members of the Society, at the age of fifty-four years.

Election of Members.

The following gentlemen were balloted for and elected Members of the Society:—Henry Ansell, Esq., Tottenham; John Matthew Jones, Esq., Welshpool; and Joseph Baly, Esq., Kentish Town.

Saturnia Ricini.

Mr. Douglas called the attention of the Society to the note by Dr. Boisduval, in the 'Annales' of the Entomological Society of France, on the Indian Saturnia, which feeds, in the larva state, on the castor-oil plant, the insect being quite distinct from S. Cynthia, with which it has been confounded, and Dr. Boisduval proposes for it the name of S. Ricini, after its food-plant.

Descriptions of new European Lepidoptera, Formicidæ, Diptera, Arachnida, &c.

Mr. Douglas also directed attention to the 'Verhandlungen' of the Zoologisch-Botanischen Verein of Vienna, containing many entomological articles of great interest, including the following:—'On the First State of some Phycideæ;' by J. v. Hornig. The natural history of the following species is given:—

Gymnancyla canella (a rare British species). The larvæ feed, in September and October, on Salsola kali, eating the stems of the plant, and living under a whitish leathery web, which never contains more than one larva.

Spermatophthora Hornigii, *Led.* The larva feeds, in September and October, on the seed-vessels of Atriplex angustifolia.

Homœosoma binævella. The larva lives, in May and June, inside the flower-heads of Carduus Acanthoides.

Cryptoblabes Rutilella, *F.-v.-R.* The larva, which is very local near Vienna, lives in the autumn on alder bushes, changes to pupa at the beginning of October, and appears in the perfect state the following May.

There are also 'Descriptions of two new Geometridæ,' by Mann; viz., Psodos alticolaria and Geometra Beryllaria. 'Dipterological Fragments;' by Dr. Schiner and Dr. Egger. 'Contributions towards a Knowledge of Ants,' containing descriptions of several new species, by G. L. Mayr. 'Contributions towards the Monography of

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the Genus of Spiders, Dysdera;' by K. Doblika. A continuation of the 'Versuch, die Europäischen Spanner;' by J. Lederer. 'Notes on the Lepidoptera of Siberia;' by J. Lederer. 'On the Myrmicidæ, and a New Genus thereof;' by G. L. Mayr.

The Common Broom (Genista scoparia), *the food-plant of Anarsia Genistæ.*

Under this title Mr. Newman communicated the following note:—

"The following memorandum, placed in my hands by Mr. William Machin, of 35, William Street, Globe Fields, Mile End, will give our members an idea when and where to look for this scarce insect, the larva of which appears, from Mr. Stainton's 'Tineina,' to have been bred only from Genista tinctoria:—'Having collected a quantity of larvæ from the common broom in a number of localities, and placed them altogether in a breeding-cage, I reared from them, on the 6th of July last, two specimens of Anarsia Genistæ; thus proving not only the food-plant of the insect, but also that it appears in the perfect state in the beginning of July.'"

New Entomological Works.

Mr. Stainton informed the Meeting that Professor Boheman had recently published a Report on the Entomological Works and Papers of 1851 and 1852, which he characterised as very complete and effective: its title is 'Berättelse om framstegen i Insekternas, Myriapodernas och Arachnidernas Natural Historia för 1851 och 1852:' Stockholm, 1854.

Mr. Stainton also said that during his recent visit to Paris he had seen a very useful work, published by Mons. Leon Fairmaire and Dr. Laboulbène, entitled 'Faune Entomologique Française,' and containing descriptions of all known French insects: two parts of the Coleoptera are published, price five francs each.

Rectifications of Misstatements.

Mr. Westwood stated that he felt it necessary to make the two following rectifications of misstatements recently published in the Society's 'Transactions:'—

"I. In p. 58, vol. iii. New Series, Mr. Curtis has stated, in a foot-note, that the characters of Coniopteryx given by Mr. Westwood in the 'Introduction to the Modern Classification of Insects' (Gen. Syn. p. 48) are copied from his 'British Entomology.' It will be necessary only to compare the characters given in these two works to see that this statement is unfounded: Mr. Westwood's original detailed description (accompanied by drawings of the anatomical details of the genus) was, moreover, read at the Entomological Society five months before Mr. Curtis published his description, and the insect was referred by Mr. Westwood to its legitimate family, whereas by Mr. Curtis it was incorrectly placed in the family Psocidæ; whilst Mr. Stephens, who had, in fact, first pointed it out as a genus, referred it to a different order."

"II. In page 134, vol. iii. New Series, Mr. Smith has described the Formicideous genus Stenamma, which he assigns to Mr. Stephens as its author; that author, however, had no other share in its establishment than that of indicating its existence in his Catalogue (p. 356), as follows:—

'Genus 92: (666) ——
4838. † 1. Westwoodii mihi. In Mus. D. Westwood.'

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The fact simply being, that knowing that Mr. Westwood possessed a new British ant, which the latter regarded as a distinct genus, he thought fit to notice its existence, identifying it with Mr. Westwood's insect by attaching his name to it specifically. The name and characters of the genus were first given in the 'Introduction to Modern Classification.' Mr. Smith states, moreover, that there are no other differences separating Stenamma from Myrmica than the three-jointed labial palpi (in Myrmica they are four-jointed), the importance of which character Mr. Smith endeavours, perhaps with reason, to disprove. But, in the 'Introduction' (ii. p. 219, 226, and Gen. Syn. p. 83), Mr. Westwood has described and figured the structure of the mandibles and maxillary palpi, which entirely disagree with those of Myrmica, proving the insect to belong to the same section as Myrmecina and Polyergus."

Mr. Stainton read the following note:—

The Occurrence of the Small Genera of Tineina in Tropical Countries established.

"The question has frequently been asked, whether the small genera of Micro-Lepidoptera, Lithocolletis, Nepticula, &c., which are so plentifully represented in these temperate regions, do not also occur in tropical climates. Those who had collected abroad denied their occurrence there, because they had never seen them; but this was a negative proof which merely established that they had not been observed, not that they did not occur there; and to observe these small genera a special education is absolutely necessary; the eye which has been trained to detect an Ornithoptera on the wing at the distance of a quarter of a mile, cannot at once, and without previous practice, notice a Nepticula at the distance of a few feet.

"I have for some time entertained the opinion that, if the exotic Micro-Lepidoptera are to be collected, it must be by some entomologist who has learned first to collect insects of that group at home, and who then carries his home-bred skill into distant regions. I regretted that when Mr. Wallace and Mr. Layard were in this country neither stopped here long enough to learn the habits of our Micro-Lepidoptera: among the species of Micro-Lepidoptera collected in Ceylon by Mr. Layard were several belonging to the family Elachistidæ, and I could scarcely doubt that a short training in this country would have enabled him to have discovered many smaller species.

"In August last Mr. Atkinson (well known as the captor of Gastropacha Ilicifolia) forwarded me some mines and larvæ of Phyllocnistis saligna and P. suffusella, and at the same time informed me he was about to start for Calcutta. I regretted to lose a useful correspondent in this country; but it directly struck me that here was an opportunity of obtaining information of East Indian Micro-Lepidoptera, which might prove of great importance to us, and I begged Mr. Atkinson to pay particular attention to any indications he might fall in with of the existence of the smaller genera in India.

"On the 6th of April I had the pleasure of receiving a letter from Mr. Atkinson, with the agreeable information that he had already detected the mines of three different species of Lithocolletis, of one of which he had reared the perfect insect, and of this species he has forwarded me some mines in the upper side of the leaves of Bauhinia racemosa, which I now exhibit; for this species, which, in the perfect state, has some affinity with our L. trifasciella, Mr. Atkinson proposes the name of Lithocolletis Bauhiniæ.

"I think this important discovery will be useful in urging upon those who may hereafter be likely to visit our colonies the necessity of completing their education in

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this branch of entomological science before they leave home, as I am satisfied that a skilled Micro-Lepidopterist in unexplored regions would, with the greatest facility, obtain novelties without end, and would also be able to observe the habits and transformations of the greater part of his discoveries, so that he would at once add to our knowledge as well as to our collections."

The President doubted if Micro-Lepidoptera would be found so plentiful in tropical countries as Mr. Stainton anticipated; for, even in the South of Europe, through which, in company with Mr. Walker, he made a tour some years ago, although they collected diligently, and sought especially for Micro-Lepidoptera in places similar to those in which they were plentiful in England, yet, out of more than six thousand specimens of insects they brought home, the number of small moths was very few. If Micro's were abundant in the tropics we should surely have had more of them sent to us.

Mr. Saunders said that when he was in India he gave very little attention to the small Lepidoptera; but he saw the mines of their larvæ in leaves, and he remembered that many small moths used to come to the lights at night.

Small Coleoptera in the Tropics.

Mr. Waterhouse said it used to be thought that tropical countries produced but few Micro-Coleoptera; but this was an error, for Mr. Darwin had brought from South America great quantities of minute beetles, collected chiefly just after the rainy season.

Mr. Westwood said Helfer had collected in India thirty species of Anthicus, besides many other small beetles, now in the collection at Prague.

Mr. Baly said Mr. Fry had in his possession a drawer-full of minute Staphylinidæ from Brazil.

'*On the Entomostraca of South America.*'

Under this title Mr. Lubbock read a descriptive paper, accompanied by drawings of the species.

A new Species of Agrotis.

Read the following description, by Mr. Henry Doubleday, of a new species of Agrotis taken in Britain:—

"Agrotis Ashworthii. *Alis anticis cinereis, strigis tribus denticulatis atris, maculâ quadratâ nigrâ inter stigmata, posticis fuscis.* (Exp. alar. 1 unc. 5—8 lin.)

"Anterior wings cinereous, powdered with black atoms, with three denticulated strigæ arising from black spots on the costa; one near the base, a second before, and a third beyond the middle of the wing. Between the stigmata (which are very indistinct) is a quadrate black spot, and another between the anterior stigma and the second striga; a fuscous cloud crosses the centre of the wing as in Tæniocampa populeti, T. instabilis, &c.; cilia fuscous. Posterior wings fuscous in both sexes, with the cilia paler; head whitish; thorax cinereous; abdomen pale fuscous; antennæ fuscous, white towards the base.

"This pretty species, which appears to be quite unknown upon the Continent, was

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discovered at Llangollen, North Wales, by Mr. Ashworth, in the summer of 1853, and the specimen forwarded to me for inspection. Last summer many specimens were taken by Messrs. Cooke, Gregson, &c., as noticed in Mr. Stainton's 'Entomologist's Annual,' where the insect is figured under the name of Spælotis Vallesiaca. The figure, however, is by no means good, the anterior wings being much too broad.

"I forwarded a specimen of the male and a drawing of the female to my friend, M. Guenée, and he says that he believes it to be quite new; I have therefore named it after its discoverer: it is closely allied to A. lucernea, A. decora, &c.'

Part iv. vol. iii. New Series, of the 'Transactions,' published in April, was on the table.

The President announced that Mons. Alex. Yersin, of Morges, Canton de Vaud, Suisse, is engaged on a Monograph of the Gryllidæ and Locustidæ, and solicits the loan of British species.

June 4, 1855.—JOHN CURTIS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Korrespondenz-Blatt des Zoologisch-mineralogischen Vereines in Regensburg,' Achter Jahrgang, 1854; by the Society. 'Proceedings of the Royal Society,' Vol. vii. No. 12; by the Society. 'The Zoologist' for June; by the Editor. 'Revue et Magasin de Zoologie,' 1855, Nos. 2, 3 and 4; by the Editor, M. Guérin Méneville. 'Annales de la Société Entomologique de France,' 3me Série, Tome ii. 1er, 2me et 3me Trimestres; by the Society. 'Journal of the Society of Arts' for May; by the Society. 'The Literary Gazette' for May; by the Editor. 'The Athenæum' for May; by the Editor. 'Contributions to Fossil Entomology' (from the 'Quarterly Journal of Proceedings of the Geological Society'); by the Author, J. O. Westwood, Esq. A selection of Indian Insects from the Himalayan district, consisting of many fine and rare species of several orders; by S. P. Pratt, Esq. Some small insects sent from Ceylon by Mr. Thwaites; by W. Spence, Esq.

Election of Members.

Herr Dohrn, President of the Entomological Society of Stettin, and William Atkinson, Esq., F.L.S., F.Z.S., F.R.B.S., &c., were balloted for and elected Members of the Society.

Exhibitions.

Mr. Stevens exhibited a splendid specimen of Ornithoptera Brookiana, the new species recently captured in Borneo by Mr. Wallace, and of which the description was read at the April Meeting of this Society.

Mr. Foxcroft sent for exhibition a box of Coleoptera, recently taken in Perthshire, including a single specimen of the very rare Dendrophagus crenatus, and a bred specimen of Anarta cordigera, with a pupa and puparium: of the latter he says,

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"They are found made up on the sunny side of stones or on the bark of birch trees; but the perfect insect selects the side of the stone or tree away from the sun."

The President exhibited the insects presented by Mr. Spence, and read the following extract of Mr. Thwaites' letter addressed to that gentleman:—

"One of the bottles contains the larvæ and imagos of a Carabideous beetle which infests the nests of a little black ant, a few of which are in the bottle. The other little bottle contains a lot of tiny species of insects of all kinds, amongst which is the pupa of a little Papilio, sent me by a neighbour as 'a most wonderful natural production,' and which, viewed through a lens, has a most extraordinary resemblance to a monkey's head."

The President also read the following note, addressed to him by Mons. Charles Delarouzée, of Paris:—

"In removing an old butt, which had served many years to hold water, to water the garden, it occurred to me that some insects might be found under it; and absolutely, by examining the earth carefully to the depth of three feet, and in the decayed wood of the butt, I took an individual of Euplectus sulcicollis, *Redt.*, and many examples of Anommatus 12-striatus and Langelandia anophthalma. I suppose that the Anommatus is a parasite of the Langelandia: probably, by searching in similar places you might ascertain the fact."

The President observed that the insect described by Stephens as an Anommatus was the Aglenus brunneus of Gyllenhal and Erichson. He believed that the Anommatus had not yet been discovered in England.

On Saturnia (Hyalophora) cecropia.

Under this title the following note, by W. S. M. D'Urban, Esq., of Newport, near Exeter, was read, and the cocoons alluded to exhibited:—

"Having seen in the reports of the Proceedings of the Entomological Society, during the last twelve months, many notices relating to the silk of Bombyx *Cynthia*, and that several persons have discovered means whereby the glutinous substance which fastens the threads together may be dissolved and the silk unwound, I am inclined to think that several other Bombyces meet with undeserved neglect, and especially the subject of these notes, which appears to be well adapted for introduction into England, since it is a native of a climate subject to severe alternations of temperature; and the larva feeding only in July and August, it would not be at all affected by the cold of this island, as most of the other foreign species of Bombycidæ are. If we add to this that it produces an immense quantity of a very strong material, and that its food-plants flourish well in England, we have all the requisites to constitute a valuable silk-producing insect. During my residence in Canada I had several opportunities of observing its transformations; but I regret I did *not* determine *accurately*, from *my own* observation, its food, as only one of its splendid larva, and that a full-fed one, came into my possession: this larva was picked up crawling across a road at Sorel, Lower Canada, on the 19th of August, 1849, and was confined in a small basket covered with gauze: after many fruitless attempts to effect its escape it finally settled itself in the middle of the handle of the basket, and there

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began spinning its cocoon (No. 1) the same evening, which, however, it did not complete till the third or fourth day after, being engaged in spinning, with scarcely any intermission, during the whole of that time. Having been kept in a warm room through the winter, it was evolved on the 7th of April, 1850, seven months and nineteen days from the commencement of its cocoon. In its natural state, however, it does not make its appearance till June, remaining, therefore, nearly ten months in the pupa. The cocoon (of which the accompanying specimens are examples) contains an immense quantity of silk, and is double—a wise precaution against the severity of the Canadian winters: the outer case is of a very close and stiff texture; but the inner or true cocoon is rather finer, and is covered on the outside with a quantity of rough silk, whilst the side next the pupa is very smooth and polished. Could it be made useful it would be a great boon, as it must be a durable material indeed to resist the wind and rain of ten months, or of even two or three years, as I have found these cocoons adhering as strongly as ever to the tree the following spring after the escape of the moth.

"Even if the cocoons could not be unwound they might be carded and spun in the same manner as they do those of Bombyx Cynthia, &c., in India. These cocoons are common about Sorel and Montreal, and still more so about Toronto, in Upper Canada, and are very easily found, as they are spun on the smaller branches of various trees, and are very conspicuous when the leaves have fallen: they are most abundant on maple, but I have found them also on apple, fir, &c., and on palings and dead stalks of weeds. It appears to feed on a variety of plants, and amongst others I have reason to think on the choke-cherry (*Prunus serotina*), of which several plants, reared from seed sent from Canada, are now flourishing in the garden here, and could be grown to any extent required. I have seen it stated that it feeds on the wild American plum (*Prunus pennsylvanica*), and that it has been occasionally reared on apple-leaves. There would, therefore, be no trouble in finding food for it in this country; and I do not think there would be much difficulty in introducing it, as the cocoons could be gathered in any number in Canada and the United States, and sent home by steamer, packed in air-tight boxes, as sea air, from my own experience, seems to be fatal to them. It would be hardly possible to send the eggs across the Atlantic, as only two months intervene between the appearance of the moth and the larva going into cocoon, it is manifest the eggs must be hatched soon after they are laid: these eggs are large and oval in shape, and pure white. If the moths, when bred in England, could be got to pair, there would then be no further obstacle in obtaining a supply of silk by the end of the following August after their arrival.

"This and the other magnificent species of Saturnia inhabiting North America present a strange appearance, when darting past in the dusk of a summer's evening, and are extremely difficult to capture, unless they happen to be found at rest during the day. Mr. Gosse does not appear to have been acquainted with this fine moth, for, although he mentions several other species of Saturnia in his 'Canadian Naturalist,' he does not notice it.

"In conclusion, should the subject be thought worthy of the consideration of this Society, I shall be happy to obtain cocoons from Canada, and forward some to any entomologist wishing to make the experiment."

References to numbers attached to the cocoons were read.

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Office of the Wing-rays of Insects.

Read, a paper by Mr. Newman, intituled 'A Memorandum on the Wing-rays of Insects,' in which the author maintains, in opposition to the published views of Herold, Kirby & Spence, Oken, Westwood, and other distinguished entomologists, that the wing-rays are the supports of the membranous portion of the wing, and in all respects the analogues, although not the homologues, of the wing-bones of the bat, and that the passage of air, blood and nerves through their channels is simply a provision of Nature for their maintenance in a healthy and efficient condition. He supported this view by a reference to experiments and observations on living insects, and also by the anatomical researches of Chabrier and Bowerbank, which he had himself verified.

July 2, 1855.—John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Proceedings of the Royal Society,' Vol. vii., No. 13; by the Society. 'The Literary Gazette' for June; by the Editor. 'The Journal of the Society of Arts' for June; by the Society. 'The Zoologist' for July; by the Editor. 'Revue et Magasin de Zoologie,' 1855, No. 5; by the Editor, M. Guèrin Méneville. 'Monograph on the British Species of Phalangidæ or Harvest-men'; by R. H. Meade, F.R.C.S.; by the Author. 'Saussure's Monographie des Guêpes Sociales', Cahir, No. 7; by the Author. A specimen of the mole cricket (*Gryllotalpa vulgaris*); by Mr. J. P. Edwards, of Lyndhurst, Hants.

Election of Members.

John Walter Lea, Esq., of Ramsgate, and Alexander Fry, Esq., of Montague Square, were balloted for, and elected members of the Society.

Exhibitions.

Mr. Meade returned and exhibited the collection of British Arachnida, preserved in glass tubes, formerly presented by him to the Society, and which had recently been forwarded to him for the purpose of replenishing the spirit in the tubes: he had also considerably increased the number of species in the collection, which now numbers ninety-four true spiders and thirteen Phalangidæ. Mr. Meade stated that he now employed as a substitute for spirit, a saline solution composed of equal weights of water and sulphate of magnesia, with the addition of a small quantity of alcohol and sulphuric acid; this does not injure the colours of spiders, as spirit almost invariably does.

Mr. Foxcroft sent for exhibition a small box of Lepidoptera, recently taken in Perthshire; it also contained the silken galleries formed in ants' nests by the larvæ of Tinea ochraceella, *Tengstr.*

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Mr. Stevens exhibited a splendid new longicorn beetle from Tana, New Hebrides, for which Mr. Adam White proposed the name of Psalidocoptus scaber.

Mr. Westwood read a note from a correspondent, who had found the larvæ of Meloë in immense numbers on potato-plants "hanging in clusters like swarms of minute bees;" he also exhibited some of the larvæ which had been forwarded to him.

Mr. Janson exhibited two specimens, one of which he presented to the Society's cabinet, of Hypulus quercinus, *Payk.*, taken by him on the same stump of oak which yielded the species last year at Colney Hatch.

Mr. Smith announced that Mr. Frederick Grant had recently discovered colonies of Tapinoma erratica at Wimbledon and Weybridge; he also exhibited the female of this species from the latter place, being the only British specimen of that sex hitherto captured.

Mr. Edward Sheppard exhibited three specimens of Drypta emarginata, found by Mr. Arthur Adams under a tuft of grass near Portsmouth, but about two miles inland.

Mr. Stainton exhibited a number of very accurate drawings of the transformations of Micro-Lepidoptera, made by Herr Grabow, of Berlin, among which the most interesting was that of Asychna æratella, which feeds in a pod-like excrescence which it appears to form on the shoots of Polygonum aviculare, in autumn.

Mr. Hunter exhibited a female Stauropus Fagi, recently taken at Black Park, and also the young larvæ about thirty-six hours old, produced from eggs laid by this specimen.

Anommatus and Langelandia.

The President stated, with reference to the communication made by him at the last Meeting from Mons. Charles Delarouzée, that he had recently been informed by that gentleman that the water-butt alluded to was sunk in the earth to the depth of three feet, which would account for his having found the insects then mentioned three feet below the surface; he added, that he had no doubt, by searching in similar situations in this country, we might discover both Anommatus and Langelandia.

Observations on the Habits of two species of Mygale.

Under the above title, Mr. Smith read the following notes, by Mr. H. W. Bates:—

"With regard to spiders, there is one observation I made, which I am sure will be of the highest interest to Science: it is with respect to the habit of the genus Mygale to prey on birds. Now, I have detected them in this fact as far back as 1849, but thought little of it at the time, as I had the idea that it was a well-known and undisputed fact in Science. Lately, however, I read an account (I think, in 'Langsdorff's Expedition in the Interior of Brazil'), where the fact is considered to rest on no foundation, and to be one more of the fables originated by Madame Merian.

"Now, I will relate to you what I saw in the month of June, 1849, in the neighbourhood of Cametá; I was attracted by a curious movement of the large gray-brown Mygale on the trunk of a vast tree: it was close beneath a deep crevice or chink in the tree, across which this species weaves a dense web, open for its exit and entrance

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at one end. In the present instance the lower part of the web was broken, and two pretty small finches were entangled in its folds; the finch was about the size of the common siskin of Europe, and I judged the two to be male and female; one of them was quite dead, but secured in the broken web; the other was under the body of the spider, not quite dead, and was covered in parts with the filthy liquor or saliva exuded by the monster. I was on my return from a day's excursion by land at the time, with my boxes full of valuable and delicate insects and six miles from my house, and therefore could not have brought the specimens home, even if I had wished, which I did not, as the spider was a very common species, easily to be procured nearer home. The species I cannot name; I sent several fine specimens, stuffed, to London, in 1851; it is wholly of a gray-brown colour and clothed with coarse pile. Doubtless, you will immediately know the exact species to which I refer.

"If the Mygales did not prey upon vertebrated animals I do not see how they could find sufficient subsistence.

"On the extensive sandy campos of Santarem, so bare in vegetation, there are hundreds of the broad slanting burrows of the large stout species (that fine one, dark brown, with paler brown lines down the legs, of which I sent specimens in 1851). The campos, I know, from close research, to be almost destitute of insects, but at the same time swarm with small lizards, and some curious ground finches of the Emberiza group (one of which has a song wonderfully resembling our yellow bunting of England), besides which, vast numbers of the Caprimulgidæ and ground doves lay their eggs on the bare ground. I believe this species of Mygale feeds on these animals and their eggs at night. Just at the close of day when I have been hurrying home, not liking to be benighted on the pathless waste, I have surprised these monsters, who retreated within the mouths of their burrows on my approach."

Some conversation ensued on the supposed poisonous nature of spiders, and the strength of the webs formed by various species, in which the President, Mr. Westwood, Mr. Meade, Captain Cox, &c., took part.

Note on Otiorhynchus sulcatus.

Under this title Mr. Newman read the following paper:—

"In the later months of summer this weevil may frequently be seen crawling about the wood-work of the fern-house, especially at night; and who does not visit his fernery by night? But occasionally you may also find the female clinging to the stipes or frond-stalks, especially of Adiantum, Cystopteris and Asplenium, genera which send up fronds in succession until the stalks look like a little forest: nestled among these, and with its head upwards, it drops its small white globular eggs, which fall quite free, and seem neither to attach themselves by any viscid covering nor to be attached designedly by the parent to the frond-stalks or other substances which may happen to be at hand. We must allow imagination to picture the hatching of the egg and the descent of the tiny grub: I find the juvenile depredators a few days afterwards ensconced in snug little cavities of the caudex scarcely large enough to admit the head of the smallest pin: they are now minute, jelly-like, transparent legless maggots; I say jelly-like, because the word describes their appearance with great exactness; but it must not be understood as implying the possession of the moist or mucous surface

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distinctive of the larvæ of some Coleopterous and Hymenopterous insects: on the contrary, the surface of these little grubs might be described in the words of pleasant old Gerarde, as clean and 'dry in the first degree:' after feeding for a very few days the colour of the grub becomes opaline and slightly opaque, the opaline tint being caused by the quantity of food in the intestines; this food becomes more and more apparent, as long as the grub continues to feed. The cavities in the caudex of the fern now rapidly become larger, and the effect is very visible above ground. When the grub is feeding most eagerly it is spring; and, one after another, the Ionic volutes of the nascent circinate fronds droop, wither and fall, plainly proclaiming the presence of the sapper and miner at work below, the canker-worm at the seat of life. When its appetite is at length satiated, the grub becomes quite opaque, and of a uniform cream-colour; the food disappears from the intestinal canal, and the creature withdraws about three-quarters of an inch from the scene of his labours. We use a light sandy soil for the ferns, and the grub seems to find no difficulty in making his way through this, and adapting it to his purposes; for he now forms a circular cell, quite large enough for himself and two friends, although he never invites them; and he polishes up the walls of this cell in the nicest and neatest manner; and, without using silk of his own spinning, or any other material except the often-watered earth, he makes every thing snug and comfortable, and settles himself in for a fortnight's rest, during which he practises total abstinence, as if to atone for his former voracity. I will describe the grub in this state of abstinence and rest. Length, ·4125 inch; greatest breadth, *i.e.* at one-third of the length between the head and the anal extremity, ·151 inch: head testaceous, horny, very shining, gibbous in front, rounded at top, truncate below at its greatest diameter, having therefore the figure of a beehive: beneath the truncature protrudes the labrum, which exhibits the anomalous or previously unobserved character of a curious pectinated process at each angle,—two strong, incurved, testaceous mandibles, having a blunt tooth near their black tip, or, perhaps, more correctly characterised as being obtusely bifid at the apex,—two maxillæ, much smaller and less conspicuous than the mandibles, but horny and glabrous; internally and apically the maxillæ bear an obtuse lacinia, having a serrated, subspinous, internal margin; externally they bear a biarticulate palpus, the basal joint of which is stout and nearly globose, the apical joint rather longer, cylindrical, and somewhat obtuse,—finally, a labium, long and narrow, bearing at each external angle a biarticulate palpus, much resembling those of the maxillæ. The body is composed of twelve segments, of which the first seems to have only its sternal surface developed, and the twelfth is little more than a tubercle; on the second on each side near the head is a circular spiracle, the only one that I can find: there are no legs, but each segment has a series of papillæ and a number of strong testaceous bristles; aided by which, the grub has very considerable powers of locomotion when placed on a somewhat uneven surface. At the expiration of a fortnight the larval state has ceased and that of pupa has been assumed; this undergoes changes of colour very much like those of the larva; at first it is hyaline, then slightly opaline, and finally cream-coloured, with very conspicuous black eyes: the peculiarities of a necromorphous pupa are now so familiar to entomologists that I need not dwell on them; every limb is free, and every joint of the antennæ and tarsi is discernible through the slender pellicle with which it is invested; the elytra, attached to the dorsal surface at the anterior margin of the mesonotum, at first bend forwards, and passing between the middle and hind legs, repose on the latter, which, in their turn, are neatly arranged in front, reposing on the sternum. An

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unexplained phenomenon must be noticed here; a considerable number of the pupæ, say one in nine, present an atrophied or shrunken appearance, and these, not possessing sufficient vitality to carry them through the final change, die, turn black, and eventually decay: coexistent with these atrophied pupæ is the presence of a certain myriapod, which I believe to be the young of Lithobius forcipatus; but the connexion between the myriapod and the weevil still remains to be unravelled. The pupa state, like that of the larva after it leaves off eating, lasts about a fortnight, and it takes another fortnight at least for the weevil to become hard and fitted for a more locomotive life; so that six weeks are occupied from the formation of the tomb-like earthy cell to the time for finally quitting it. The beetle, when first emancipated, is of a dull white colour; it soon turns to a pale, testaceous brown, which gradually becomes darker and darker, until the final deep hue and hardened surface are attained: it then breaks the walls of its self-constructed prison and crawls solemnly and slowly about the greenhouse, probably in quest of amorous adventures, to be followed by those parental duties, which are a necessary consequence of that command which went forth at the beginning to weevils as well as to man, 'Increase and multiply.' It is more than twenty years since I first traced the history of this insect, which is a most dangerous enemy to the horticulturist: my observations were then directed to its operations on Saxifraga sarmentosa, the crown of leaves and flowering stalks of which I constantly found completely severed from the roots by this subterranean marauder, but I think this is the first time it has been noticed in connexion with ferns."

Insects injurious to Forest-trees.

Captain Cox remarked that Chrysoclista Linneella was swarming on the trunks of lime-trees in Hyde Park, the bark of the trees in many places being almost destroyed by the larvæ: he also alluded to the destruction now progressing of many fine elms and other trees in the parks by the Scolytus, &c., and regretted that those in authority would not adopt the very simple means to remedy the evil.

August 6, 1855.

John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'The Literary Gazette' for July; by the Editor. 'The Athenæum' for July; by the Editor. 'Journal of the Society of Arts' for July; by the Society. 'Journal of the Royal Agricultural Society of England,' Vol. xvi. Part 1; by the Society. Hewitson's 'Exotic Butterflies,' Part 15; by W. W. Saunders, Esq. 'Die Gallen. Versuch die durch Insecten an den Pflanzen Verursachten Auswüchse nach ihren Haupttypen und Wachsthumsverhältnissen naturgemäss zu gruppiren,' von Georg Frauenfeld; by the Author. 'Revue et Magasin de Zoologie,' 1855, No. 6; by the Editor, M. Guérin-Méneville. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part III. Lepidoptera Heterocera; by the Author, Francis Walker, Esq., F.L.S. A box of Indian insects; by Major

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Hamilton. A specimen of Sirex gigas; by G. H. Drew, Esq. Bembidium Clarkii (6) and Bembidium obliquum (8) from Northamptonshire; by the Rev. Hamlet Clark.

Election of Members.

Mons. F. Pictet, Professor of Zoology and Comparative Anatomy in the Academy of Geneva, was elected an Honorary Member in the room of Dr. De Haan, deceased; and Edward Henry Burnell, Esq., 32, Bedford Row, was elected an Ordinary Member of the Society.

Exhibitions.

Dr. Power sent for exhibition some rare British Coleoptera, including Agrilus chryseis, Anthraxius nitidula, Rhyncolus ater, Microrhagus pygmæus, all from the New Forest, and Drypta emarginata (2), recently taken by himself near Portsmouth.

Mr. Bond exhibited some Lepidoptera recently taken by him in Cambridgeshire: the more remarkable species were Pionea margaritalis, Nascia cilialis, Eupithecia sparsaria, Anesychia funerella, Opadia funebrana, Argyrolepia Schreibersiana, and a singular dark variety of Arctia villica.

Mr. Baly exhibited a specimen of Cryptocephalus nitens, taken from an ash tree at Cobham, Kent. Mr. Stevens said he captured an example of this species yesterday on a birch tree at Mickleham.

Mr. Doubleday sent for exhibition specimens of Caradrina blanda and C. alsines, species quite distinct, but mixed in collections under the former name.

Mr. Weir exhibited a remarkable variety of Anthrocera Filipendulæ, with only five spots on each of the upper wings, taken *in copulâ* with an ordinary six-spotted specimen. He likewise exhibited Penthina sauciana bred from Vaccinium myrtillus, Anarsia Genistæ bred from Genista tinctoria, and other rarities.

Mr. Dutton exhibited some Lepidoptera recently captured in the Isle of Wight, among which were fine specimens of Agrotis lunigera.

Mr. Douglas exhibited a specimen of Trochilium Chrysidiforme taken by Mr. J. A. Brewer, of Reigate, while sweeping for Coleoptera, near Dover, on the 25th of June last, and presented alive to Mr. Douglas. This species had hitherto only two British representatives; one, now in Mr. Edwin Shepherd's collection, stated in Mr. Stephens's 'Illustrations' to have been captured by Mr. Francillon; the other, in Mr. Curtis's collection, taken by Mr. Leplastrier near Dover.

Mr. Douglas also exhibited Asychna æratella from Darenth Wood, and Butalis fusco-ænea from Headley Lane: both species were taken last month.

Mr. Westwood exhibited a living scorpion brought from Mexico with plants for the Horticultural Society. He also exhibited eggs and living larvæ of the flea of the dog, and stated that Mr. Haliday had recently dissected some of the larvæ; and he believed that Mr. Haliday's researches will prove that the flea does not belong to the order Diptera, but to the order Aphaniptera of Kirby. He added that the eggs of the flea were not attached to the surface on which they were laid, as had been stated; for upon moving the cloth or rug on which his dog was accustomed to lie the eggs rolled off.

Mr. Westwood exhibited a specimen of Ludius ferrugineus which he had had alive for a fortnight, and which was reared from an old ash tree by Mr. Boddy.

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Mr. Westwood also exhibited specimens of the Saturnia reared at Malta from examples recently introduced from India as S. Cynthia; and he also exhibited specimens of the true Saturnia Cynthia received from Major Jenkins, in India, with a ticket attached stating that this was the species whose caterpillars produced the "Eria" silk. The difference between these specimens and those from Malta was so trifling that he thought Dr. Boisduval had scarcely sufficient grounds for making the Indio-Maltese species distinct from S. Cynthia, as he had recently done in the French 'Annales,' under the name of S. Ricini; and argued from the known modifications which occur in the races of the common silk moth, as well as in the Saturnia Paphia (which produces the Tusset Silk of India), as described by Helfer, and in fact from the analogy of domesticated animals in general, that if the progeny of a single pair of S. Cynthia were distributed over a wide geographical range, in three or four generations, quite as much difference would be observed among the specimens as between these so-called distinct species.

Mr. Stevens exhibited a splendid butterfly, a new species of Agrias recently sent from Villa Nova by Mr. Bates.

Mr. Foxcroft sent for exhibition some Coleoptera and Lepidoptera recently taken in Perthshire. Among the latter were two Polia occulta, apparently differing from the general type of that species only in the darkness of their colour, but their larvæ were said to be totally unlike. This statement was corroborated by a note from Mr. Logan, of Edinburgh, read to the Meeting.

Abundance of Noctuidæ.

Mr. Douglas remarked that the number of Noctuidæ this season appeared to be unusually large near London, and he should like to know if this abundance was general.

Mr. Stevens said that on the previous night, at Mickleham, he saw 800 or 900 Noctuidæ attracted to sugar.

Mr. Westwood said other sweets than sugar were exceedingly attractive to moths: in his garden Noctuidæ abounded about a bed of beans which were infested with Aphides, whose excrement, as was well known, formed a sweet deposit; and they also swarmed around some gooseberry bushes, whose fruit, in consequence of the wet weather, had burst.

The President said that in a large conservatory near Alton he had lately seen large quantities of Noctuidæ, which, attracted by the scent of the flowers, had entered by the open door and could not find their way out. He added, that Captain Chawner had told him that occasionally, at the lighthouse at Lowestoft, the moths abounded so much at night that the keeper had to sweep the lantern in order to clear them away.

The Society's 'Transactions.'

Part 5, Vol. iii., N. S. of the 'Transactions' was on the table.

The following was read at the April meeting:—

Description of a New Species of Ornithoptera.

"Ornithoptera Brookiana. *Wallace.*

"Expansion 6¼ inches. Wings very much elongated; black, with a horizontal band of brilliant silky green. On the upper side this band is formed of seven spots

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of a subtriangular form, the bases of the four outer being nearly confluent, and of the three inner quite so, forming a straight line across the centre of the wing; the attenuated apex of each spot very nearly reaches the outer margin at each nervule. On the lower wings the green band occupies the centre half, and has its upper margin tinged with purple. The lower wings are finely white-edged. There are some azure atoms near the base of the upper wings. The collar is crimson, and the thorax and abdomen (?) black. Beneath black, upper wings with the green spots opposite the bases of those above, small and notched, the basal one with brilliant purple reflexions, also a purple streak on the anterior margin at the base. Lower wings with a submarginal row of diamond-shaped whitish spots divided by the nervures; base of wings with two elongated patches of brilliant purple. Body obliquely banded with crimson; abdomen black.

"Hab. N.W. Coast of Borneo.

"This magnificent insect is a most interesting addition to the genus Ornithoptera. The green-marked species have hitherto been found only in N. Australia, New Guinea and the Moluccas, and all those yet known so much resemble each other in their style of marking, that most of them have been considered as varieties of the original Papilio Priamus of Linnæus. Our new species is therefore remarkable on two accounts; first, as offering a quite new style of colouring in the genus to which it belongs; and, secondly, by extending the range of the green-marked Ornithopteræ to the N.W. extremity of Borneo. As it has not been met with by the Dutch naturalists, who have explored much of the S. and S.W. of the island, it is probably confined to the N.W. coast. My specimen (kindly given me by Captain Brooke Brooke) came from the Rejang river; but I have myself once seen it on the wing near Sarawak. I have named it after Sir J. Brooke, whose benevolent government of the country in which it was discovered every true Englishman must admire.

"Alfred R. Wallace."

September 3, 1855.

John Curtis, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'The Journal of the Society of Arts' for August; by the Society. 'The Literary Gazette' for August; by the Editor. 'The Athenæum' for August; by the Editor. 'Proceedings of the Royal Society,' Vol. vii., No. 14; by the Society. 'Revue et Magasin de Zoologie,' 1855, Nos. 1 and 7; by the Editor, M. Guèrin Méneville. 'Lettre addressée à M. Jacquelin du Val,' par M. H. Jekel, sur le Barypeithes rufipes (Extrait des Annales de la Soc. Ent. de France); by the Author. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' by Francis Walker, F.L.S., Part iv., Lepidoptera Heterocera; by the Author. 'Entomologische Zeitung,' May to August; by the Entomological Society of Stettin. 'Recueil d'Observations de Zoologie et d'Anatomie Comparée,' par Al. Humboldt et A. Bonpland, texte; presented by the President. 'Nouveau Genre

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de Carabiques, de la Tribu des Carabides;' 'Description de Seize Espèces de Longicorns du vieux Calabar, à la côte occidentale d'Afrique;' 'Description de Vingt et une Espèces Nouvelles de Coléopterès Longicorns;' all by the Author, Mons. A. Chevrolat. Twenty species of British Lepidoptera; by F. Bond, Esq.

Exhibitions.

Mr. Foxcroft sent from Perthshire some of his captures of Coleoptera, consisting chiefly of Brachelytra.

Mr. Douglas exhibited Elachista Brunnichiella bred from larvæ mining leaves of Clinopodium vulgare; Lithocolletis comparella, reared from a leaf of Lombardy Poplar, from Mickleham; and a pair of Gelechia maculiferella, taken *in cop.* on a window of his house at Lee.

Mr. Waring exhibited some remarkable varieties of Boarmia repandaria, Tephrosia crepuscularia and Anticlea rubidata; all from the neighbourhood of Coomb Hurst, Croydon.

Mr. Edwin Shepherd exhibited a specimen of Leucania musculosa (L. nervosa, *Haw.*), captured near Brighton by Mr. J. N. Winter.

Mr. Westwood said that during a recent visit to Plymouth he had captured Aëpus marinus on the shore; and under some sea-weed he saw, but could not catch, a minute Dipteron, which he had little doubt belonged to the genus Clunio.

Mr. Westwood called the attention of the meeting to three new works by Dr. Burmeister, which he had just received. The first, intituled 'Uebersicht der Brasilianischen Mutillen,' a monograph of the Mutillidæ, would include, besides the species described by Dr. Klug in the 'Nova Acta,' all those discovered by Dr. Burmeister himself in Brazil. The second, 'Untersuchung über die Flügeltypen der Coleopteren,' treated of the venation of the wings in Coleoptera, an Order hitherto very partially investigated in this respect. The third, 'Kritische Bemerkungen über M. S. Merian's Metamorphoses Insectorum Surinamensuim,' which would be enriched in its progress by the author's researches into the natural history of insects made during his residence in Brazil.

The President said that during a recent tour on the Continent he had learned that the third volume of Professor Lacordaire's 'Suites á Buffon' was nearly ready; also that M. Candèze had collected a large amount of material for his monograph on the Elateridæ, and still hoped to receive from English entomologists the assistance he had asked, and that they were so well able to afford.

Mr. Haliday, at the request of the President, gave some account of the matters of entomological interest that had come under his notice during the Continental tour he had recently made in his company. That which had especially attracted his attention was an adaptation of a microscope to a camera obscura by Herr Weinnertz, of Crefeld, whereby the image of an object was thrown upwards on to a horizontal surface of glass, and a drawing on tracing-paper was made with great facility. For copying the venation of wings it was especially useful, and had been extensively employed by Herr Weinnertz; Mr. Haliday esteemed it a preferable and far more easy method than the camera lucida.

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October 1, 1855.

JOHN CURTIS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Mémoires de l'Academie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique,' Tomes xxviii. and xxix.; 'Bulletins de l'Academie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique,' Tome xxi. Part 2, Tome xxii. Part 1; 'Mémoires Couronnés et Mémoires des Savants étrangers, Tome vi. Part 2; 'Notices Extraites de l'Annuaire de l'Observatoire Royale de Bruxelles pour 1855,' par le directeur, M. A. Quetelet; 'Sur la Relation entre les Températures et la Durée de la Végétation des Plantes,' par M. A. Quetelet; 'Annuaire de l'Academie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique, 1855;' 'Bibliographie Académique ou Liste des Ouvrages Publiés par les Membres Correspondants et Associés Residents;' by the Académie Royale des Sciences, &c., de Belgique. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' Année 1853, Parts 3 and 4; Année 1854, Part 1; by the Société Impériale des Naturalistes de Moscou. 'Bibliotheca Historico-Naturalis Physico-Chemica et Mathematica, von Ernst A. Zuchold,' Vienna, 4er. Jahrgang, 2 Heft, July bis December, 1854; by the Author. 'Proceedings of the Liverpool Literary and Philosophical Society during the Forty-fourth Session, 1854—55,' No. ix.; by the Society. 'The Journal of the Society of Arts' for September; by the Society. 'The Literary Gazette' for September; by the Editor. 'Hewitson's Exotic Butterflies,' Part 16; by W. W. Saunders, Esq. 'The Zoologist' for September and October; by the Editor. 'The Natural-History Review,' No. 7; by the Editor.

Election of a Member.

James John Reading, Esq., Plymouth, was elected a Member of the Society.

Exhibitions.

Mr. F. Smith exhibited a fine collection of Coleoptera, made during September, at Deal, including the following species:—

Gymnaëtron Beccabungæ	Phytonomus fasciculosus	Choragus Sheppardi
Ceutorhynchus Resedæ	Otiorhynchus rugifrons	Helops pallidus
Acalles misellus	Limobius mixtus	Haltica Modeeri
„ Roboris	Lixus bicolor	Harpalus cordatus
Sibinia primita	Apion vernale	Amara curta
Erirhinus scirrhosus	„ Sedi.	

Also the following Hymenoptera, taken at the same time and place:—

Pompilus rufipes	Pompilus crassicornis	Astata stigma
„ plumbea	Ammophila lutarea.	

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Mr. Smith also exhibited a minute Dipterous insect, Elachipteron brevipennis, caught by him at Deal on the back of an Hemipterous insect, Nabis subaptera, in the act of inserting its ovipositor under the elytra.

The Rev. J. F. Dawson exhibited a fine series of both sexes of Harpalus cordatus, *Dufts.*, a species so rare in England that at the time his 'Geodephaga Britannica' was published (1854), only a single specimen was known. All the specimens he now exhibited were recently captured by himself at Deal.

Mr. Foxcroft sent from Perthshire for exhibition a box of Lepidoptera, of which the best species were Depressaria cinifionella and Pœdisca ophthalmicana.

Mr. Bond exhibited a fine series of Heliophobus hispidus, recently captured by himself in the Isle of Portland.

Dr. Power exhibited a specimen of Dinodes Maillei, *Dej.*, taken among moss at Gurnard Bay, Isle of Wight, by Mr. Arthur Adams. Mr. Dawson said that as this species was a native of the Morea, and was not found in the countries intermediate between there and England, it could hardly be considered indigenous to Britain: he had frequently seen insects not natives of this country floating in the sea off the Isle of Wight, which he suspected had been brought to the vicinity in ships, and it was possible a similar mode of transit might have occurred in this instance. Mr. Edward Sheppard said Mr. Adams had assured him that there was no mistake about this specimen, for he had a perfect recollection of its capture.

Mr. Newman exhibited a specimen of Xylocopa violacea, accompanied by the following memorandum:—"This bee was taken by Mr. Charles Wood at Dulwich Common, the second week in June last: it had flown into a greenhouse, and Mr. Wood, who is a professional gardener, was attracted not only by its extraordinary appearance, but by its loud humming when on the wing. A bee, supposed to be of this species, is described and figured in the 'Monographia Apum Angliæ,' vol. ii. p. 310, and pl. xvii. fig. 9, under the name of Apis iricolor, but the specimen, now in the cabinet of our Society, is evidently an American species, and must have been introduced into Mr. Kirby's cabinet by some mistake. Donovan's 'British Insects,' vol. xii. p. 25, and pl. 403, fig. 1, may also be consulted. I believe the present to be the only really British-captured species of this beautiful bee, but it is very abundant in some parts of France, and I have seen many specimens in the garden of the Tuileries: the large importation of shrubs (especially orange trees) from the Continent for the Crystal Palace may perhaps account for its introduction. I should add that Mr. Wood, finding the interest I took in the capture, has most obligingly presented me with the specimen."

Mr. Stainton exhibited leaves of Vicia Sepium containing larvæ and pupæ of Lithocolletis Bremiella, a new British species, from the neighbourhood of Bexley. Only on Wednesday last he received some similar mined leaves from Frankfort, and, thus instructed, he succeeded in finding these examples on Friday; on Sunday two moths came out, and these were also exhibited.

The President exhibited a scorpion in spirit, presented to him by Mr. Henry Page as the largest ever seen in Sierra Leone.

Destruction of Crops by Insects.

Mr. Westwood said that Mr. D. W. Mitchell, the Secretary of the Zoological Society, had forwarded to him some withered turnip-leaves, as a sample of the plants on ten acres of land, all similarly caused to perish by the attacks of insects: these

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leaves were accompanied by many Syrphi; but these had not done the mischief, for, as was well known, they fed upon Aphides, which no doubt were the real depredators. Although the tubers would doubtless perish in consequence of the loss of the leaves, yet they were not affected by gangrene, and so there was no analogy with the destruction of the tubers of the potato, attributed by Mr. Smee to the attacks upon the leaves by the Aphis vastator.

Mr. Lubbock mentioned a similar destruction of turnip crop near Farnborough; and the President said he had heard of another instance near Cranford: he was also sorry to add that Athalia Spinarum or "the black nigger" of the turnip was very abundant this year in several districts.

Mr. Westwood also stated that there had been a vast amount of injury caused this year by the larvæ of saw-flies to pear, cherry, gooseberry and other fruit-trees, amounting in some instances to a total destruction: he thought it might be a very useful subject of inquiry, if the prodigious multiplication of these insects was due to any peculiarity of the season, especially as it appeared that, under some such influence, certain flowers had failed, and others had flourished this year better than usual.

Indian Lepidoptera.

Mr. Stainton read the following extract from a letter addressed to him from Calcutta by W. S. Atkinson, Esq.:—

"What mistakes writers at home make about exotic species! In Swainson's 'Zoological Illustrations,' second series, vol. iii. pl. 101, you will find the pupa of Papilio Polydorus suspended from the tail: this he should have known must be a mistake; I have had several, and of course, like the rest of the Papilios, its head is uppermost, supported by the silken girth. There is a strange confusion about P. Nomius, *Boisd.* (P. Niamus, *Swains.*): Swainson has a very good figure of this well-marked species (which I take here): he says, 'It is a native of *Southern* Brazil, and of such rarity that in two years we never met with more than one specimen;' and Boisduval, vol. i. p. 252, says, 'J'ai cru jusque'à ces derniers temps que les individus que je poissède venaient du Bengal, quoique Godart indique cette espèce comme d'Amerique; mais il me parait demontré aujourdhui que j'avais commis une erreur à habitat, puisque M. Swainson dit l'avoir prise lui-même dans le *Nord* du Brésil:' Swainson must surely be mistaken; for it is hardly likely that this insect is an inhabitant of both the old and new continents. Again, Boisduval, on the authority of Westermann, unites P. Pammon and P. Polytes as male and female: this is certainly not the case. P. Pammon is one of the commonest butterflies here, and I have had several females of the species; some of these, but not all, have red lunules below the central white of the posterior wings, in that respect resembling P. Polytes, but they are never without the band of white blotches on the anterior wings. Blyth, the Curator of the Asiatic Society's Museum here, entirely agrees with me in this; but he assures me that he has seen these two and P. Polydorus *in copulâ* with one another, but that he has tried in vain to rear a brood from them."

Mr. Westwood remarked that General Hearsey had brought from India Papilio Pammon and P. Polytes, which he had found united.

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Elateridæ feeding on Aphides.

Mr. Douglas read, from the 'Entomologische Zeitung,' the following note by Pastor Kawall, of Courland:—

"I am able to confirm the fact that the Elaters do not confine themselves to vegetable juices, but attack Aphides. As long ago as June 7, 1847, I saw Elater tesselatus eat Aphides upon Viburnum opulus, and I observed it closely with a lens. I also noticed Elater Ephippium and E. elongatus on Prunus padus similarly occupied. At other times I have seen Elateridæ sucking (the juices of) plants."

Coleoptera of Siam.

Mr. Edwin Shepherd read the following extract from a letter addressed to Mr. Adam White by J. C. Bowring, Esq., Corr. M.E.S., at Hong Kong:—

"You may perhaps have heard that I accompanied my father on his mission to Siam; I did so for change of air, which I sadly wanted. I cannot say that I got the rest and quiet I needed, as we were fully occupied during the whole of our stay at Bangkok, and there was scarcely a night that we were not at it until half-past one or two o'clock: as the thermometer nearly every day was up to 92° or 94°, this was somewhat trying to a semi-invalid, and I am sorry to say I do not find any benefit to have accrued from my trip. Having been so busy you may imagine that I had not much time to bestow on our favourite Entomology; I brought away with me, however, some 500 Coleoptera, taken principally in doors, the insects having been attracted by the lamps: this number, considering all things, is very respectable; but, excepting a few longicorns and Rhynchophora, the species are of very minute size, the whole having been brought away in a pill-box; they are now being mounted, and cut a decent figure. I scarcely yet know how many species there are amongst them, but certainly over a hundred, and any duplicates I have shall go to the British Museum. Most of the insects which came in to the lights were small Bembidiidæ, Staphylinidæ and Pselaphidæ: of these last I have some sixty specimens, comprising five or six species. Bangkok, indeed, would seem to be the very metropolis of the Pselaphidæ kingdom, as every morning numbers were found drowned in the cocoa-nut oil in the burners, and I could have got many hundreds of these greasy gentry.

"The country seems to swarm with insects of all kinds, and any collector who could spare a season for Siam would reap a glorious harvest. On our way from Siam to Singapore we had to call at Pulo Aor to cut wood, having run out of fuel; and while our men were at work in their way, I was so also in mine. It was such a fatiguing matter to force a way through the jungle, the sides of the hill (the whole island being a mountain rising precipitously from the sea) being so steep that I was not very successful, and only obtained about forty Coleoptera, of one or two of which I have duplicates, and these you shall have.

"In Hong Kong Coleoptera I cannot be expected to progress very fast; it is a rare thing now for me to fall in with a novelty, but still I do so occasionally: the other day I got my first specimen of the only beetle in poor Champion's collection, which I did not possess when he left China,—an Orthogonius; I don't know whether it has been described. My Chinese Coleoptera now number some 1300 species.

"I fear we shall not get many novelties from Japan, under our new arrangements with that country; the place, I imagine, will be as much closed against us as ever,

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and Admiral Stirling's convention, instead of in any way rendering it accessible to us, seems to me to have quite a different bearing. I *had* quite been looking forward to the receipt of a host of curious forms from that extraordinary country, but I have completely given up all such expectations."

Mr. Newman communicated the two following notes:—

Note on Trochilium Chrysidiforme.

"In the report of the August meeting our Secretary has appended to the interesting record of the capture of Trochilium Chrysidiforme an assertion that the species had previously but two British representatives: if he will turn to page 3289 of the 'Zoologist,' he will find a record by Mr. Barron of the capture of a third specimen near Haslar Hospital."

Hats manufactured of the Silken Felt spun by Saturnia Spini.

"It will be recollected by several of our members that I had the pleasure of mentioning, at a former meeting, the fact of the silk of Saturnia Spini being applied to economical purposes at Vienna. I have lately learned from my friend Mr. Pretsch, who was also my original informant, that the silken felt which I then described has been most successfully applied to the manufacture of hats by Herr Flebus, of Vienna, who has taken out an Austrian patent for this object. The hats are extremely durable and perfectly waterproof, being rendered so by the glutinous nature of the silk itself: they are held in great estimation by sportsmen and gentlemen much exposed to the weather, but the cost has hitherto been too great to admit of any extensive sale. Herr Flebus is, however, about to establish a factory in the district of Erzgebirge, situate between Bohemia and Bavaria, induced by the abundance of the food of the caterpillar and the cheapness of human labour."

New Locality for Geodephaga.

Mr. Douglas said it might be worth while to inform Coleopterists that a week since he took Tarus axillaris and Licinus depressus three miles beyond Croydon: these species had not hitherto been found nearer to London than Reigate or Boxhill.

November 5, 1855.

JOHN CURTIS, Esq., President, in the chair.

The Meeting was made Special, in pursuance of a Requisition addressed to the Council, for the purpose of considering the By-Laws relating to Associates, and it was decided that these By-Laws should be annulled.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Smithsonian Contributions to Knowledge,' Vol. vii.; 'Eighth and Ninth Annual Reports of the Board of Regents of the Smithsonian Institution;' 'Descriptions of some New Marine Invertebrata from the Chinese and Japanese Seas,' by

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William Stimpson, Zoologist to the U. S. Surveying Expedition to the North Pacific, Japan Seas, &c., Lieut. John Rogers, Commander; all presented by the Smithsonian Institution. 'Proceedings of the Boston Society of Natural History,' conclusion of Vol. iv., and sheets 1 to 11 inclusive of Vol. v.; by the Society. 'Proceedings of the New Orleans Academy of Sciences,' Vol. i., No. 1; 'Constitution and By-Laws of the New Orleans Academy of Sciences;' by the Society. 'Patent Office Report—Agriculture;' by the United States Patent Office. 'Ninth Annual Report of the Board of Agriculture of the State of Ohio;' by the Ohio State Board of Agriculture. 'The Natural History of the Tineina,' Vol. i.; by the Editor, H. T. Stainton, Esq. 'Proceedings of the Royal Society,' Vol. vii. No. 15; by the Society. 'The Zoologist' for November; by the Editor. 'Revue et Magasin de Zoologie,' 1855, Nos. 8 and 9; by the Editor, M. F. E. Guérin-Méneville. 'The Journal of the Society of Arts' for October; by the Society. 'The Athenæum' for October; by the Editor. 'The Literary Gazette' for October; by the Editor. 'Entomologische Zeitung' for September and October; by the Entomological Society of Stettin.

Exhibitions.

Mr. Stainton exhibited, on behalf of Mr. Winter, a specimen of Phlogophora empyrea, a Noctua new to Britain, recently taken by him at sugar near Brighton; also some extraordinary varieties of Agrotis segetum and A. exclamationis. Mr. Winter also sent for exhibition a fine female specimen of Ennomos Alniaria, taken on a lamp at Brighton: the only other authentic British specimen of this species hitherto known was taken on the North Foreland Lighthouse several years since, and is now in Mr. Shepherd's collection.

Mr. Stainton exhibited, on behalf of Mr. Henry Cooke, a specimen of Polyommatus Agestis, which closely approached the Scotch specimens known as P. Artaxerxes, the pupils to the ocelli on the under side being obsolete.

Mr. Samuel Stevens exhibited a new British Tortrix, recently taken at Hayling Island, near Havant; also specimens of Goniodoma auroguttella, *F.-v.-R.*, taken by him in August last, in the Isle of Wight; and a specimen of Dictyopteryx uliginosana, *Bent.*, from Ely, Cambridgeshire: the only two specimens of this last species hitherto known were taken near Yaxley many years since, and are now in Mr. Shepherd's collection.

Mr. Westwood exhibited a specimen of the rare Quedius dilatatus, found in a hive of the honey-bee, and also the net-work cocoons of Hypera rumicis; both communicated by Professor Henslow. The President remarked that M. Gory had informed him that he once took a number of the Quedius in Fontainebleau Forest, in the neighbourhood of a hornet's nest. Mr. Stevens said that a specimen had recently been taken by Mr. Turner in the New Forest, in the decaying carcase of a heifer. Mr. Waterhouse observed that M. Chevrolat had informed him that he found this species at night on trees infested with the larva of Cossus; and Captain Parry once found a specimen in his own garden under the loose bark of a tree so infested.

Mr. Foxcroft brought for exhibition a large collection of Lepidoptera and Coleoptera, taken by him during the past season in Scotland.

Mr. Syme exhibited specimens of the rare Sphærites glabratus, taken by him from fungi at Kincardine.

Mr. Stevens stated that, on his recent visit to Paris, he found a preparation of naphtha very successfully applied to removing grease from insects: he had, since his

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return home, found that a similar article was manufactured at Liverpool, and sold under the name of "Copland's Rectified Borneote of Petroline;" this he had found equally as useful as the French preparation for extracting grease, and exhibited a number of Lepidoptera and Coleoptera which he had so cleaned: the highly volatile nature of these preparations is said to give them an advantage over camphine for this purpose, in not requiring the specimens to be subsequently placed in magnesia or other absorbent powder.

Dr. Power exhibited specimens of Notiophilus rufipes, which species he had recently taken at Shirley, near Croydon, also near Gravesend, and at Cowley, near Uxbridge: he also exhibited an opaque female of Hydroporus picipes; in this species both sexes are usually glabrous.

The Rev. Hamlet Clark exhibited a new British species of Hydroporus, recently detected by him in the collection of Mr. Waterhouse.

Mr. Stevens exhibited a box of Coleoptera recently received from Mr. Wallace, at Borneo, containing many new and fine species, especially amongst the Longicorns.

Mr. Newman read the following notes, exhibiting the insects to which reference is made:—

Silk-spinning Acarus of the Furze, &c.

"I beg to exhibit a mass of silk spun by a minute Acarus, and obligingly handed me, together with multitudes of the little specimens, by Dr. Milner Barry, of Tunbridge Wells, who writes as follows:—'When strolling across Rusthall Common this afternoon I noticed some red powder lying in thick cobwebs entangled in the furze: I took up some of the powder, and found it was living and moving, and consisted of myriads of vivacious red insects resembling Acari.' When the mass reached my hands it was of the size and shape of a sparrow's egg, the Acari running over it in all directions, and each adding to the bulk by leaving behind him a continuous thread of the finest conceivable silk. I subsequently sent the mass to Mr. Meade, the Arachnologist, who has carefully examined it, and kindly sent me the following information:—'The minute animals inhabiting the curious cocoon you sent me are Acari, belonging to the genus Tetranychus of Dufour, the type of which is the little red spider so injurious to plants in hot-houses and rooms, the Acarus telarius of Linnæus: most of the species live in society, on plants, and possess the power of forming webs: Koch says, when speaking of an allied species, Tetranychus socius, 'It appears in certain years in such numbers that it covers the trunks and the branches of the lime-trees which it frequents, with such a thick web that they look as if clothed with glazed satin.' I cannot find any description of the species sent by you, although it is closely allied to the common Tetranychus telarius, and I never before saw or found anything like the curious nest which it inhabits.' Since the receipt of Mr. Meade's note I have paid some little attention to the Tetranychus telarius, and find that the net-work of infinitely minute silken threads is admirably adapted to its singularly formed feet, and these are equally well adapted to the office of holding on while it perforates the cuticle of the leaf with its rostrum: its hold is so secure that no amount of washing by means of a garden-engine seems to have the effect of removing it: as I have no doubt whatever that these little creatures are exclusively vegetable-feeders, the web cannot serve, as in spiders, the purpose of securing prey, and it is, moreover, never accompanied by the glutinous particles which render the web of spiders so adhesive: as a matter of course, if the

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Acari can resist the action of a water-engine they have little to fear from the effects of rain."

An Australian Bombyx escaping from its Cocoon in England.

"I beg to exhibit a male specimen of the Entometa obliqua of Walker, an Australian moth, allied apparently to Zeuzera, Œceticus and Psyche: the insect has recently emerged from a sack-formed cocoon, and had it escaped and been captured on the wing it would doubtless have found a place in our catalogues. Mr. Oxley, to whom I am indebted for the loan of the specimen, exhibited the cocoon, amongst others, at one of our meetings last year, and adds the following information:—'Although I am unable to state at what date the cocoon in question was collected, yet I may observe that the last cocoons of any kind that I collected in Australia were obtained in March, 1854, a month equalling the September of this country. The long period of fifteen months that this moth must have passed in the pupa state I attribute to the rigours of a passage round Cape Horn and to the intense cold of the last English winter.' In reference to this note, I may remark the pupa state in Eriogaster, and many allied genera, is of very inconstant and uncertain duration, and that the same irregularity may possibly take place in certain Australian Bombyces."

Abundance of Noctuidæ, &c.

Extracts were read from letters to the President from Mr. T. Allis, of York, on the abundance of Noctuæ generally in the North of England during the past summer; and from Mr. J. Hogg, of Stockton-on-Tees, also remarking the abundance of Noctuæ, and the comparative rarity this autumn of the common wasp (*Vespa vulgaris*).

Gall-fly of the Oak.

The President communicated the following note on Cynips:—

"When Mr. Haliday visited Glanville's Wootton last month, he collected some galls from the oaks, which he put into a bag, and on the 22nd ult. he writes to me from Dublin to say that 'On examining the bag some days since I found several dozens of the Cynips out, but not one Callimome. It seems marvellous how the fly can escape through so small an orifice as it leaves, and I should like to see one emerge. I cannot identify it with any Linnean or Fabrician species, but it is the C. lignicola* of Hartig, and the only one of that group to which the insect of the ink-gall belongs which occurs so far North as England or even Northern Germany. This group, distinguished by the pubescence extended to the posterior segments of the abdomen, includes the largest species of the genus, and those which cause the most elegant and largest galls.' This, I presume, is the Cynips I consider as the C. Quercus-petioli of Linnæus."—J. Curtis.

* "Mr. Dale's specimens have also hatched; yet, abundant as the gall now is, he had not the species before."—J. C.

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December 3, 1855.

JOHN CURTIS, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'The Zoologist' for December; by the Editor. 'Entomologische Zeitung' for November; by the Entomological Society of Stettin. 'Ueber die Micropyle und den feinern Bau der Schalenhaut bei den Insekteneiern;' by the Author, Prof. Rud. Leuckart, in Giessen. 'On the Illumination of the Diatomaceæ, when viewed under the Microscope;' by the Author, Thomas Sansom, A.L.S., &c. 'The Journal of the Society of Arts' for November; by the Society. 'The Literary Gazette' for November; by the Editor. 'The Athenæum' for November; by the Editor.

Election of Members.

Octavius Pickard-Cambridge, Esq., Bloxworth House, near Blandford, Dorset, was elected a Member of, and R. B. Were, Esq., 35, Osborne Terrace, Clapham Road, and Horace Francis, Esq., 38, Upper Bedford Place, Russell Square, were elected Subscribers to, the Society.

Exhibitions.

Mr. Edwin Shepherd exhibited a beautiful pair of Trochilium Scoliæformis, *Borkhausen*, taken with other specimens by Mr. Ashworth, at Bryn Hyfryd, near Llangollen, in North Wales. This insect has just been described for the first time as British in the December number of the 'Zoologist,' p. 4928, by Mr. Newman.

Mr. Stevens exhibited a few drawings of the larvæ and pupæ of some of the Lepidoptera of Port Natal, made there by Mr. R. W. Plant; also perfect insects of some of the species, whose early states were figured.

The President exhibited some drawings of insects made by himself, and made the following communications respecting them:—

"1st. A very pretty variety of Vanessa Urticæ, given to me by F. Trenchard, Esq. The specimen was taken by himself 'near the entrance-gate in Bishop's Wood, Hampstead, July 21st, 1838.'

"2nd. A drawing of a caterpillar which I made when at school, and first noticed in the second edition of my 'British Entomology.' It seems to be the larva of Sphinx Celerio, yet it does not accord with any drawing or engraving I have seen: it is of an obscure flesh-colour, with a large round black spot on each side of the first abdominal segment, with four minute white dots on each, and the outer edges forming two straw-coloured lunules; behind each, on the second segment, is a smaller oval yellowish-white spot. The following memorandum was made at the time:—'Two of these caterpillars, from one of which this drawing was taken, were found in the arms of an old garden-chair, in a garden near Bishop's Bridge, Norwich: they began to spin up amongst some leaves in a pot on the 8th of October, 1810: they fed on the Persian willow (*Epilobium angustifolium*). In the other specimen there were five minute dots

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on one side and but three on the other: the white spot in my drawing is a little too large, and the tail of the other caterpillar was longer.' They were in the possession of a schoolfellow, Howard Sims, and changed to chrysalides amongst some leaves, from which the moths never emerged, owing to the frequent disturbance of them.

"3rd. A drawing of Hygrotus bisulcatus, which I described in the 'Annals of Natural History,' and which is quite distinct from any of the European species that have fallen under my notice.

"4th. A drawing of the Apion named after me, in 1817, by the Rev. W. Kirby. I am very desirous of laying this sketch before the Society, in order to correct a misstatement which I should be sorry to see repeated. Being at that time on a visit at Barham, I took a single specimen of an Apion, which Mr. Kirby decided to be unknown to him, and of which he made a detailed Latin description for publication, and I made the drawing: being in my youth at the time, Mr. Kirby paid me the compliment to name an Apion after me; I could not but feel gratified, and although I believe Mr. Kirby's description was never printed, Mr. Janson is quite mistaken in supposing that I had named the Apion after myself, or that it was a discovery since 1839, as assumed in the 'Entomologist's Annual:' the latter misstatement is corrected by the above date, and I should be sorry to be considered capable of such a contemptible act of egotism as to name an insect after myself. The truth is, that Mr. Stephens having with queries described a mere variety of a common and very distinct species as the Apion Curtisii, it became necessary to identify the type, which I did by describing it in the 'Annals of Natural History' as the Apion Curtisii of Kirby's MSS. Whether Mr. Kirby's description, with many others of which I have copies, were handed over to Mr. Stephens with the MSS. of the Staphylinidæ, is unknown to me."

Mr. Stevens remarked that this Apion remained unique until he had the good fortune to take the species at Little Hampton and near Arundel.

The President also communicated the following note:—

On the Genus Conops.

"Little is known of the economy of this beautiful genus of flies, except that C. flavipes has been bred from the body of an Osmia, which had nidified in bramble-stems. Other species have also been stated to be parasitic on the Bombii, and Conops auripes is supposed to lay its eggs on the body or between the abdominal segments of Bombus hortensis. As there are eight or nine British species of Conops, some of which are occasionally tolerably plentiful, it would be very desirable that Mr. Walcott, Mr. Smith and other entomomologists who pay so much attention to bees, should bear this subject in mind.

"My principal object, however, is to make known the localities of two rare species of Conops which are merely recorded in Mr. Walker's first volume of the Diptera in the 'Insecta Britannica' as 'Rare' and 'Very rare':—

"1. C. macrocephala, *Linn.*, described and figured in the 'British Entomology' in 1831, was first captured in England by Mr. Dale, who took a single specimen on the 18th of August, 1824, on the flowers of Scabiosa succisa in a meadow at West Hurn, Hants, and he has taken a second specimen, on the 23rd of June, 1846, on a path in

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Boscomb-chine, which he kindly added to my collection: I also possess another, taken last summer near Rannoch, in Perthshire, by Mr. Foxcroft. They resort to Orchis flowers; and all that I have seen are females.

"2. C. nigra, *De Geer*. This species has also been captured in Scotland, in Sutherlandshire, in June. Where Mr. Desvignes' specimen was taken Mr. Walker does not state; it is merely indicated as an English insect."

Note on Quedius dilatatus.

Mr. Westwood said, with reference to the specimen of the beetle exhibited at the last meeting, that he had received a note from Mr. Johnson (from whom, and not from Professor Henslow as reported, he had received the beetle), enclosing a note from Mr. Wighton, of Cossey Hall, stating that, although he found the insect in a bee-hive, it was in a nest of hornets built therein.

The following notes by Mr. Newman were read:—

The old Aurelians outdone.

"At the November meeting Mr. Foxcroft exhibited some mutilated specimens of Endromis versicolor—mutilated, I mean, by sundry tears and rents in their wings. Every entomologist knows how these fellows wander all day long 'on amorous thoughts intent.' Who has not watched them in the 'Kentish glory field' at Birch, flying high over the heather, or dashing themselves incontinently against the polished stems of the birches? Now I know not whether our most sagacious friend had literally 'clipped the wings of Love,' but, although 'Love is (proverbially) blind,' he certainly assured us that he followed these 'blind guides,' and profited by the clipping, for it seems no amount of mutilation (of the wings) interferes with the amorous instinct, and that these cripples continued to tumble about amongst the heather and dwarf birch-trees, until they led him to female 'glories,' which he forthwith impaled. Harris, Haworth and Hatchett, our guides and philosophers in mothcraft, have bequeathed to us instructions how to employ maiden females as man-traps to decoy the unwary and too-amorous males; but this is the first time the male has turned traitor, and lent his services to disclose the virgin's bower."

Mr. Douglas remarked that once, at Wickham, Messrs. Farr, Fisher and himself took females of Lasiocampa Rubi by watching the spots where the males congregated.

A Fact bearing on the Function of Antennæ.

"It will be recollected that in an early Part of our 'Transactions' (Trans. Ent. Soc. ii. 229), there is a paper by the late Mr. Newport, 'On the Use of the Antennæ of Insects,' in which that eminent physiologist contends that they are auditory organs. We all admit that the subject is surrounded with difficulties, and therefore it is not very astonishing that the learned author failed to convince many of his readers, myself among the number: it has lately attracted attention from another point of view. In tetrapterous insects the antennæ are invariably two, but in some of the [illegible] they are four at least; in others they are altogether wanting, and it is an

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interesting fact, and possibly a bit of collateral evidence in favour of the feeler hypothesis, that where this is the case the legs are eight instead of six, and the first pair actually perform the part of feelers: when we watch the spider, whose sense of touch is so obvious and so exquisite as to have excited admiration in all ages, we cannot resist the conviction that, whatever other function may be entrusted to them, the anterior legs are certainly organs of feeling. In the Crustacea we have to deal with other facts and another structure: the legs are ten instead of eight or six, and none of them are either homologically or analogically the substitutes for, or representatives of, antennæ, since normal antennæ are not only present, but are always twice, and sometimes three or four times, as many as in tetrapterous hexapods. Physiologists have theorized very differently on the functions of these multiplied antennæ. Milne-Edwards considers the outer or longer pair as auditory organs; he is confessedly influenced by the supposed auditory chamber situated at their base, and he leaves the interior or shorter pair to be considered olfactory or feeling organs; but Mr. Spence Bate, in a paper lately published in the 'Annals' (No. 91, dated July), attempts exactly to reverse this theory, contending, at great length, that the long exterior antennæ are olfactory, the short interior ones auditory. Recent observations on the living prawn (*Palæmon serratus*) throw grave doubts equally over the generally received view of Milne-Edwards and the more elaborately argued, but more hypothetical suggestion of Mr. Spence Bate. The antennal system of the prawn, although familiar to the Crustaceologist, is perhaps not equally so to the general entomologist, and therefore a brief description may not be out of place: the antennæ are eight in number; conventional and technical usage — whether wisely or not who shall say?—reduces them to four: all are alike in structure, filiform and multiarticulate; the exterior on each side is the longest; the other three are of different length, are united at their base, and are seated on the summit of a stout triarticulate footstalk. These three antennæ are invariably called 'branches' by the closet-naturalist; but the field-naturalist and the physiologist must of necessity call them 'antennæ;' first, because not apprised of the conventional usage respecting them, and, secondly, because, reasoning on the fact that the branches of the antennæ in true insects are never articulated, they do not expect to find multiarticulate branches in the antennæ of any animal. It may be very easy to argue that the two longest of these many-jointed threads ought to be ears, and that the other six ought to be noses, or *vice versâ*, but seeing how precisely they agree in structure,—seeing that the microscope fails to detect a difference,—and seeing, moreover, as we shall see, that there is no perceptible discrepancy in the mode in which the living animal may be said to handle these weapons of perception, it is very difficult to convince the matter-of-fact mind of a naturalist that the argument is conclusive or the hypothesis established. Thanks to Mr. Warington, the prawn is now as easily kept in confinement as the rabbit or the guinea-pig, and we have every opportunity of observing how he behaves himself both under congenial and adverse circumstances: under every condition the antennæ are constantly in action; always also acting in concert, as by a common impulse for a common object. Mr. Warington, in his admirable account of the prawn, in a late number of the 'Zoologist,' says that he considers the sense of smell as residing most strongly in the antennæ; and he relates, far better than I can, the wonderfully beautiful manner in which the prawn appears to hunt its food by scent. The following experiment I have often tried, and invariably with the same result:—Fix on the point of the usual feeding-fork a small piece of meat; plunge it in the sea-water near the prawn, but not near enough to touch or disturb him; then draw it through the

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water to the most distant part of the vessel, bring it to the surface, disengage it from the fork, and let it fall gently to the bottom. In a very few seconds the prawn becomes aware of the operation; he knows that food is or has been in his vicinity; he stands erect on his legs; he lashes the water with his antennæ, and, rising from the make-believe rock whereon he was previously resting, hovers in mid-water, still waving his hair-like antennæ until one of them has bisected the line of transit of his food: this line ascertained he follows it without hesitation; ascends to the surface; plunges to the bottom; seizes the meat with his claws and conveys it to his mouth: during the entire operation, seldom prolonged beyond a minute, the motion of all the antennæ is constant and indescribably beautiful; and it would require a far keener eye, a far more vivid imagination than mine, to detect or to suppose an auditory faculty exercised by some of them and an olfactory one by others. A second and even a third prawn will sometimes follow the trail after the first has passed, and I have seen three at once in active pursuit, like fox-hounds running with the scent breast-high. It is difficult in such a case as this to escape the conviction that the antennæ ascertain the course to be taken: to see the creature would remove the doubts of the most sceptical on this point; at first all the antennæ are porrected, but when the trail is once struck, and the pace of the hunter consequently improved, pair after pair bend back, with the rapidity of the motion. It is equally difficult to imagine that the passage of the meat through the water has left a sound: savour or odour are probable, sound certainly improbable. Thus as, in the first instance, we are willing to believe that the antennæ guide the creature to its food, so, in the second place, we are willing to conclude that the senses of touch and smell are those most likely to be called into action by a substance totally incapable of producing sound."

Mr. Westwood remarked, that whereas authors had given the number of antennæ in the prawn as four, Mr. Newman had doubled it, and to arrive at this conclusion he must have taken the threefold branches of two of them as distinct organs.

Mr. Lubbock, in continuation, said that, on this hypothesis, the number of legs should be quoted as twenty instead of ten.

Read also two papers by Mr. Newman:—

'*Description of two New Species of Thrips.*'—Specimens of these insects were taken in a jungle near Mysore, on the leaves of a species of Anacardium, by Major Hamilton, and were sent by that gentleman inclosed in a letter to the Secretary.

'*Descriptions of some Australian Lepidoptera.*'—In this paper the author has described fifteen new species of Lepidoptera, taken by Mr. Oxley on the Mount Alexander range, in the colony of Victoria.

Note on Oak-galls.

Mr. Westwood read the following extract from the 'Gardener's Chronicle' of December 1st:—

"I believe that it was only last year that the attention of the Entomological Society of London was called to the existence of the hard oak-gall (*Cynips Quercus-*

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petioli, Linn.) in this country, though previously noticed by Mr. Westwood. But surely it must have been of rare occurrence in this country until of late years, or it would have been observed before; and even now I believe it is confined to the southern counties of England. At all events I have never seen it in the midland counties, or indeed north of Somersetshire, and I should much wish to know if any one has hitherto seen this gall-nut further inland than I have mentioned. This may be important to know, as I believe the range of the gall-nut is extending, and with obvious injury to young oak plantations, so that the gall-fly that produces the nut is becoming an absolute pest in Devonshire and Somersetshire, and I am led to inquire if anything can be done to arrest its progress. It is very different from the innocuous soft galls upon the leaves, seldom very numerous, and dropping off with the foliage in the autumn. But these gall-nuts of C. Quercus-petioli are mostly persistent upon the tree, and continue there for a long time hard as bullets. They seize upon the young shoots of the year, often the leading shoot in young trees, and cluster at its termination, thus stopping the expansion of the buds by taking up their nutriment, and keeping the trees in a dwarf state. I have now before me young shoots that are terminated by eight or nine of these hard brown galls clustered together; and I recently noticed in the oak plantations on Worle Hill, near Weston-super-Mare, that many young oaks had been quite ruined by their leading shoots being thus loaded, and some were absolutely dead. Now I have reason to believe that this attack upon the oaks, at least in this plantation, is of recent origin. Four years ago I first observed a few on two or three trees, and looked upon them as a curiosity; last year I was surprised to observe many more, and the present autumn, in walking through one portion of the plantations only, and without going out of the path, I counted 91 trees that were more or less subjected to this scourge—for thus it has become. Some, it is true, had only about a score of galls or so upon them, but many had hundreds clustered upon their branches thick as grapes, and the smaller trees were evidently drooping and checked in their growth by the absorbing villainous galls. Some of the trees were actually withered and dead, and others had their leading shoots killed, with the evident cause burdened upon them. It is clear to me that fresh trees are attacked every year by the increasing insect that produces the galls, and what can be done to stay their assaults? Though I only counted 91 trees in the Worle Hill plantations, I dare say I could have doubled this number by going deeper within the coppice; but say that only these 91 oaks had 50 gall-nuts on a tree—although many had hundreds of them—that only would give more than 4500 of the Cynips to commence the next season with, so that next year instead of only 91 trees attacked I may expect to find thousands, on every tree perhaps throughout the plantations. The mischief is that the oaks are certainly rendered barren by these hard gall-nuts, and wherever they occurred on the larger trees there were no acorns at all produced. It has been suggested that these gall-nuts may be used in the manufacture of ink, but I should doubt to such a profitable extent as to keep the oaks entirely for that purpose; and if not it is but a poor consolation to have ink produced only to record the destruction of plantations made and kept up at some expense in the hope of good timber being some day ripe for sale. Can any suggestion, then, be made upon the subject now, before the Cynipidal hordes have spread to all the oak trees in the country, whether of Quercus robur or Q. sessiliflora?—*Sylvanus, St. John's, near Worcester.*"

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Note on Paussidæ.

Mr. Stevens read the following extract of a letter from Mr. R. W. Plant, dated Port Natal, April 16, 1855:—

"In the box I now send you will find forty-seven or forty-eight Paussidæ: this is an uncommon piece of good fortune, and I must give you the history of this lot. I stumbled on the locality by accident, about three months ago, and picked up six. I revisited the spot for several days, though I had five miles to go, without seeing another, till, remembering they preferred sultry weather, I watched for the next opportunity, and was rewarded with ten; afterwards the approach of a thunder-storm was the signal to start, and beside my beetles I generally got a drenching. Respecting their habits I think the notion that they live with the ants, or are at all desirous of their society, is an error: all that I saw were close prisoners and jealously guarded: at first my anxiety to secure them prevented much close or cool observation, but as my box filled my curiosity revived, and at last it was possible to command myself sufficiently to gratify it. The beetles are in the bottom of the tufts of grass, and, owing to the small size and matted nature of the herbage, are very difficult to discover in that position, but it is the business of the ants to find them, and well they perform it. Their holes are usually along the edge of the grass (or at least it is there only they are to be seen), and as each unlucky culprit of a Paussus is found, five or six or more of the ants seize upon and drag him off to their nest. I have seen the beetles, in their efforts to escape, struggle out of the holes, but they are soon overtaken and brought back again. The ants do not kill them on the spot, as they do some other creatures, simply because they can convey them home alive, and the beetle does not seem to possess or use any means of injuring the ants, trusting only to his strength in the struggle, and is consequently soon overpowered by the number of what I take to be his enemies. At first it would appear easy to solve the question by opening the the ants' nests; but as the soil breaks you lose the trace, and they are usually very deep, so that nothing very definite results. I found pieces of elytra, but whether from beetles that had died naturally or had been killed I cannot say. The sum of my observations, therefore, amounts to this,—the Paussi do not seek the ants nor remain with them voluntarily; on the contrary, they use every possible exertion to escape, though not one that I saw succeeded in doing so; they are captives to the ants; and for what other purpose should the latter toil in their capture, but in the pursuit of their natural instinct to secure food wherever it is offered?"

On the Spirit with which Scientific Books should be Read and Studied.

Mr. Stainton read the following paper, intituled as above:—

"He who takes up any scientific work, with the intention of reading it and learning something therefrom, must do so with extreme caution: he must not, however celebrated the writer of the work may be, assume that all that he finds contained in it *is* true; he may admit that it *may be* true; but he must bear in mind that it only represents the state of knowledge *of the writer at the time* he wrote it.

"All science is progressive; and future observation will certainly show that, however elaborate the work may be, and however much in advance of other works on

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the same subject which have preceded it, on many points it is in error; and he who assumed it to be all perfectly correct would certainly be in the wrong.

"It is owing to this circumstance that we can have no such thing as a *standard* work on any branch of science. If we take up a scientific book, written twenty years ago, on any subject which has been much worked at subsequently, we cannot help being struck with the vast amount of error which it contains,—error sometimes on points of great scientific importance.

"Is there any reason to doubt that twenty years hence similar faults will not be found in the scientific master-pieces of the present day?

"I will instance a case in point, by way of making myself perfectly intelligible. In Duponchel's 'Lépidoptères de France,' Vol. vii. Part 1, p. 396, we find the assertion that Cucullia Scrophulariæ is only a pale and small variety of C. Verbasci. 'It is sufficient to breed a certain number of larvæ of this latter in order to obtain this variety; M. Marchand père, a very good observer, has several times had experience of this.' When, some years ago, I was going systematically through Duponchel's work, I was much struck with this statement; for in this country the species were always reputed distinct, though few could point out wherein the distinction lay; and, as Duponchel's statement rested on the repeated observations of 'a good observer,' the inference would naturally be that the statement would be correct. But, turning to Duponchel's 'Supplement,' Vol. iii. p. 412, published in 1836 (nine years after Vol. vii. Part 1), we find 'We were wrong in supposing, on the testimony of M. Marchand, that Cucullia Scrophulariæ was only a variety of C. Verbasci; it is a good distinct species, which in truth much resembles the latter in the perfect state, but of which the larva is very different;' and as, of course, though the correction refers to the previous error, the error has no means of referring to the subsequent correction, those who read the first statement, assuming all they find in that volume to be true, would be necessarily led into error, from which it may be years before they get freed.

"Those writers who have studied to most effect the works of previous authors naturally become very careful not to state too dogmatically any circumstance concerning which they have the slightest lurking doubt; but it will sometimes happen that other facts, which they had considered fairly established, and of which they had in their own minds no doubt, are still subsequently found to be untrue; and hence it is that the very best scientific work must always be studied, with a scrupulous care lest we be led by it to place implicit faith on statements which are not true.

"It frequently happens that a writer on another branch of science will make use of some statement that he has met with in a scientific work, and base on it some long argument and ingenious theory, which, where the original ground-work is found to be untrue, becomes simply ridiculous.

"This caution in the use of scientific works is necessary to the most advanced of us; but it is especially needed by the young student. He naturally looks up with reverence and respect to the great names of the Professors of Science, and, unless specially warned of the danger, would think it a sort of treasonable scepticism to doubt anything which has been written by authors of such celebrity; but the time *will* come (if he continues to *study*) when he will find that his confidence and reliance had been misplaced; and then he will be inclined to atone for his former idolatry of his favourite authors, by an unjust and harsh criticism of them, because the subsequent experience of men of science had proved the previous writers in error on many points.

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"If we will expect perfection in any scientific work, we must not be surprised if our expectations are disappointed.

"But, on the other hand, whilst taking great care to keep our minds unbiassed by the various statements, lest they should be untrue, it is not necessary that we devote our whole attention to the detection and exposure of the errors we may notice. The object of some writers would appear to be not so much to advance science, as to prove that another eminent man has made a blunder. Those who act on this principle are little aware how excessively puerile and petty such conduct appears to the lookers-on: 'wise in their own conceits,' they pause not to notice how others view the matter; and yet I believe there is hardly an instance on record where one writer pulling another to pieces has not been more blamed for his malicious intent than praised for his cleverness. Even scientific men have some feeling left, and *the heart* is more thought of than *the head*.

"If a book be read and studied without any view to depreciate the writer, and without any undue assumption that every assertion contained in it *is* true, good must result to the student: he reads in a teachable spirit, and without a blind following of the author as though he were an infallible guide.

"It is a very serious question how this disposition of the student may be best produced and encouraged. If we admit that it is almost a *sine qua non* to true learning, it becomes of the first importance that this teachable spirit should early obtain its fullest development.

"All *thorough* students, in almost any department of science, will find that this is the spirit which has grown upon them in the progress of their scientific investigations; and each must regret that in the outset of his career he had not had the benefit of the advice of his seniors to assist him in an earlier attainment of it; for, however true it may be that 'we never learn but from our own experience,' still, if we are continually hearing of the experiences of others, it enables us to derive profit far more rapidly from our own.

"The desire to learn is, I believe, more general than we are disposed to think; but the want of the *art of learning* is with many the stumbling-block. How that *art* is to be acquired, I am not prepared to say.

"But my object is not to write a voluminous paper on a subject which is not exclusively entomological, and which on that account may be open to objection, as not adapted to the 'Transactions' of the Society; I have simply been desirous of calling attention (and I hope I have made myself in some degree intelligible even to the least advanced) to one of the greatest helps to progress in the pursuit of scientific study.

"I am perfectly aware that some of the unlearned may advance the suggestion, 'What's the use of writing books, and giving us the trouble of reading them, if the half of them is untrue?' and to these objectors I cannot better reply than in the words of His Royal Highness Prince Albert, on the occasion of his laying the first stone of the Birmingham and Midland Institute, on the 22nd of last month:—

"'It is sometimes objected by the ignorant that science is uncertain and changeable, and they point to the many exploded theories which have been superseded by others as a proof that the present knowledge may be also unsound, and after all not worth having. But they are not aware that, while they think to cast blame upon science, they bestow in fact the highest praise upon her. For that is precisely the difference between science and prejudice; that the latter keeps stubbornly to its position, whether disproved or not, whilst the former is an unarrestable movement towards

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the fountain of truth—caring little for cherished authorities, or sentiments but cont nually progressing—feeling no false shame at her shortcomings, but, on the contr the highest pleasure when freed from an error, at having advanced another step towa the attainment of Divine truth—a pleasure, not even intelligible to the pride ignorance.'"

Part 6., Vol. iii., N.S., of the Society's 'Transactions,' recently published, was the table.

January 7, 1856.

'J. O. WESTWOOD, Esq., V.-P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be given t donors:—'Transactions of the Linnean Society,' Vol. xxi. Part 4. 'Proceedin the Linnean Society,' Nos. 59, 59,* 60, 61, 62, 63, 64, 65, 66. Address of Th Bell, Esq., V.P.R.S., &c., the President; together with obituary notices of dec Members, by John Bennett, Esq., F.R.S., the Secretary, read at the Annive Meeting of the Linnean Society on Thursday, May 24, 1855. 'List of the Lin Society of London, 1855;' presented by the Linnean Society. 'The Natural tory Review,' Vol. i. and Parts 5, 6, 7 and 8; by the Dublin University Associ 'The Entomologist's Annual for 1856;' by the Editor, H. T. Stainton, Esq. of the Specimens of Lepidopterous Insects in the Collection of the British Mu by Francis Walker, Esq., F.L.S., Part 5, Lepidoptera Heterocera;' by the E 'The Literary Gazette' for December; by the Editor. 'The Athenæum' for D ber; by the Editor. 'The Zoologist' for December; by the Editor. 'Journal Society of Arts' for December; by the Society of Arts.

Election of Members.

William Marshall, Esq, Springfield, Upper Clapton; John Thomas Sym 11, Gower Street, Bedford Square; and James Thomson, Esq., 23, Rue de l'U sité, Paris, were balloted for and elected Members of the Society.

Exhibitions.

Mr. Samuel Stevens exhibited a box containing three fine species of Lu taken by Mr. Wallace at Sarawak, in Borneo, including a remarkable varie Brookiana.

Mr. Edward Sheppard exhibited a specimen of Lebia crux-minor, ta sweeping the long lythe at Selborne, in August last, by the Rev. G. Livesay.

Mr. Westwood called attention to some glasses on the table, containing beetles collected for the purpose of stocking aquariums, by Mr. F. S. Leach.

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Mr. J. A. Turner exhibited a box of Coleoptera from Texas, containing many fine specimens of Longicorns; he also exhibited a splendid pair of Goliathus giganteus, from the Gaboon River, West Africa.

Capture of Callimorpha Hera in England.

Mr. Stainton exhibited a specimen of Callimorpha Hera, and read the following letter, addressed to him by Mr. Cooke, of Pelham Terrace, Brighton:—

"I send for your inspection a specimen of this species, captured at Newhaven, on the 5th of September, 1855. It was captured in the evening, whilst flying round a lamp, by a boy, who carried it *alive* to a most respectable tradesman, who is an entomologist, and in the habit of giving a trifling sum for insects captured in this manner. I saw it a few days ago, and it was then kindly presented to me.

"That this specimen was fairly captured in the High Street of Newhaven is beyond all question: the respectability of the individual from whom I obtained it effectually precludes all doubt on this subject; but there are two or three points which, in the course of discussion, may be fairly raised. Newhaven is a sea-port, and ships of various countries resort to the harbours: there is a regular line of steam-boats running from Newhaven to Dieppe, and French fishing-boats also occasionally enter the harbour. Now, it is just possible that this insect might by some means have got into the rigging of some craft in a port in France, and be thus brought to Newhaven; or, which is less likely, it 'took ship' as a larva, changed to a pupa whilst on board, and happened to emerge from its quiescent state whilst the craft that bore it was lying snug in the harbour of Newhaven. That the perfect insect or the larva or pupa was brought over by any one and let loose, either intentionally or accidentally, is, I think, a thing far too unlikely to be entertained. This insect *might*, with the aid of a favourable breeze, have flown across the Channel: the distance from point to point is about fifty-five miles.

"As far as I can see, these are all the objections that can be raised with a view to the exclusion of this insect from the British list; and, having said all I can against it, I now proceed to state a few circumstances that have occurred, under my own observation, relative to this species.

"Soon after I took up my residence at Hastings, in 1850, I came in contact with a young man who occasionally collected insects; and in reply to inquiries he stated that he 'had not much in his collection, only a few hawks and a striped tiger.' I went to see this 'striped tiger,' and found it to be a specimen of Hera. I questioned him very closely as to how he obtained it, and he most positively declared that he caught it. He stated that he had caught two of them, one in Hastings, in 1847, flying round a lamp (and which he had given away), and the other in 1848, at Halton (a suburb of Hastings, extending inland about a mile). This latter was the one I saw. He stated he took it in the day-time, crawling on a bank covered with different kinds of herbage; it had been rather roughly treated (he said he carried it home in his hat), and had all the appearance of a genuine specimen in the hands of a novice. I have no reason for doubting this man's statement; but it must be borne in mind that Hastings is also a port, or rather a coast-town, and is visited by French fishing-boats.

"In the autumn of 1850 I went one evening, in company with a friend, to Fairlight (about four miles from Hastings), for the purpose of collecting; and about sunset, and while it was yet quite light, my friend called my attention to 'an extraordi-

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nary tiger' that he was chasing amongst the low bushes and coarse grass and herbage; I joined in the hunt, got within three feet of the insect, struck at it with my net, but only succeeded in catching a bush, and knocking the insect down into the 'rough:' I searched for it long and eagerly, but did not get it. Of the identity of this insect I had no doubt: I was then, and still am, perfectly convinced that it was neither more nor less than Hera. I was so close to it, and the markings of the insect were so very distinct, that I had no doubt on the subject. As I cannot produce the insect, but can only say that I saw it fly, I am aware this piece of evidence will not go for much with other people.

"In the autumn of 1852 I was one day passing along near Icklesham, about six miles from Hastings, and the same distance from the sea; and I found, in a spider's web, the greater portion of the wing of a moth, which, although faded, was clearly of this species. I had not convenience for properly preserving it, but placed it in my cigar-case, and succeeding in destroying it, much to my regret.

"I made no use of these two latter pieces of information, for the simple reason that in the one case I could only say I saw the moth fly, and in the other that I found a portion of a wing, which, for want of proper stowage, was destroyed. This, I know, is very unsatisfactory information to lay before entomologists; but still, taken in connexion with the apparently truthful statement of the Hastings' amateur, these facts have made such an impression on my own mind, that I feel convinced the species is British. It is, of course, quite impossible that I can convey to other people the same strong impression that has been produced on my own mind by a string of facts occurring under my own observation: it is one thing to feel convinced myself, but it is quite another thing to set about convincing other people. I feel so fully satisfied the species is British, that I heartily welcome the Newhaven specimen, and shall place it in my cabinet.

"I think this species might reasonably be expected to appear on the South coast; and, if we knew a little more of the habits and food of the larvæ, perhaps it might be discovered in comparative plenty.

"That insects do occasionally cross the Channel I fully believe. I have had specimens of Convolvuli brought to me, whilst I was living at Hastings, that were taken twenty-five miles at sea; one being taken out of the water, its struggles on the surface having attracted attention; and two others, at different times, having been seen flying, and watched until they settled on the rigging of boats, and then captured. I also had a specimen of Villica that settled on a boat about fifteen miles at sea; and I myself have seen Brassicæ and Aglaia seven or eight miles from land.

"Whether these circumstances will be sufficient to procure for Hera a position in our British list I know not; but I have fairly stated all I can, both against and in favour of it."

Mr. Newman communicated the following:—

Characters of Three Pseudomorphina in the Cabinet of Mr. Waterhouse.

"Mr. Waterhouse having most obligingly lent me his collection of Pseudomorphina, I have given the specimens a somewhat careful examination, and find three species which I suppose to be undescribed. I take the liberty of offering to the Society brief descriptions of these, and at the same time of soliciting the opportunity of examining other collections of these interesting insects.

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"PSEUDOMORPHA AMAROIDES, *Newman*.

"*Lævis, glabra; antennis, sterno, ventre, pedibusque piceis; capite nigro, labro ferrugineo; prothoracis et elytrorum disco nigro, marginibus arcte at manifesto ferrugineis.* (Corp. long. ·3 unc. elytrorum lat ·15 unc.)

"Smooth, shining, black above, pitchy black beneath; antennæ pitchy black; head smooth, with two obscure foveæ on the epicranium between the eyes, black, the labrum and mandibles bright ferruginous, the latter with the apices pitchy black; prothorax black, its lateral margins slightly dilated and recurved, and brightly ferruginous; near its posterior margin are two shallow ill-defined foveæ; the scutellum is conspicuous, triangular, acute and extremely glabrous; elytra black, their costal margin continuous with the lateral margins of the prothorax, and like them slightly dilated and recurved, and brightly ferruginous; at the base of each, very near the scutellum, is an obscure fovea; the posterior margin is sinuate, truncate, and tinged with dusky ferruginous, the marginal ferruginous line of prothorax and elytra is very narrow, but extremely well defined; the entire upper surface of head, prothorax and elytra is covered with very minute confluent punctures; these are only discernable under a lens of high power, and scarcely detract from the general glabrous appearance of the insect.

"There is a single specimen, the only one I have seen, in Mr. Waterhouse's cabinet. Its habitat is 3753.

"Although the *genus* Amara is now banished from our catalogues, the mind of the British Coleopterist, clinging fondly to the *word*, will see the drift of my specific name, should he ever meet with this pretty antipodean. Its size and figure at once call to mind the most familiar species of that most familiar genus.

"ADELOTOPUS EPHIPPIATUS, *Newman*.

"*Lævis, nitida, picea, elytrorum paginâ basali late testacea, prothoracis latera pallidiora valde dilatata et reflexa; prothorax elytris latior.* (Corp. long. ·2 unc. elytrorum lat. ·075 unc.)

"Smooth, shining, pitchy black; the sides of the thorax and the entire under surface of the insect inclining to ferruginous; the elytra at their base adorned with a somewhat saddle-shaped testaceous mark; head, prothorax and elytra minutely and regularly punctured; head prone, deeply immersed in the prothorax; labrum rounded and much produced, cheeks enormously developed; prothorax much broader than long, slightly broader than elytra, its anterior margin excavated to receive the head, and produced into an obtuse teeth on each side of it, its lateral margins much dilated and recurved; scutellum very minute; sides of elytra parallel, slightly recurved, apex truncate, the corners rounded.

"Examples of this insect, which, when its mouth is examined, will probably form a new genus, are in the cabinet of the British Museum, as well as in that of Mr. Waterhouse.

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"ADELOTOPUS RUBIGINOSUS, *Newman*.

"*Lævis, nitidissimus, rubiginosus, omnino concolor, elytra sub lente forti subtilissime puncta.* (Corp. long. ·175 unc. elytrorum lat. ·07 unc.)

"Smooth, extremely shining, ferruginous and perfectly concolorous on every part of the upper and under surface; head rather large, convex, prone; eyes large, distant, black, prominent; prothorax very convex, very glabrous, its lateral margins slightly dilated and recurved; scutellum rather large, conspicuous, triangular; elytra very convex, parallel, the costæ slightly dilated and recurved, the apex truncate, the disk exhibiting a very slight appearance of striation.

"This pretty little beetle certainly resembles Mr. Westwood's Adelotopus aphodioides, described at p. 404 of the fifth volume of the new series of Guérin's 'Revue et Magasin de Zoologie.' There are specimens in the cabinet of the British Museum, as well as in that of Mr. Waterhouse."

Nests of Hymenoptera from Port Natal.

Mr. Smith exhibited some nests of Hymenopterous insects collected by Herr Guenzius at Port Natal, and read the following notes respecting them:—

"I have the pleasure of exhibiting to the Society a number of nests of exotic Hymenoptera, collected by Herr Guenzius at Port Natal. This collection is rendered exceedingly interesting, by each nest having specimens of the insects by which it was constructed sent with it; it also receives additional interest from the fact of all the species being described ones. I have thought it desirable to give a reference to the work in which each species is described, as well as a description of the nests themselves.

"1. Synagris calida, Vespa calida, *Linn. Syst. Nat.* Vol. i. p. 952. The nest of this insect is constructed of the red earth common to the neighbourhood of Port Natal; the form at the base is an irregular oval; its length at its greatest diameter is nearly three inches; the height of the nest is an inch and a half, its general form being somewhat that of half an orange, having one side slightly elevated, forming the entrance to the nest; the bottom of the nest shows that it has been attached to a flat surface; only four cells are visible, all of which are empty; in two of these were found the remains of the corneous heads of some Lepidopterous larvæ; the upper surface has a hole opposite each of the empty cells, one being immediately under the larger opening or entrance used by the parent insect: the other holes are a little smaller: from these no doubt the insects made their escape: there is room for two more cells, and such may possibly exist, but neither the under nor upper surface exhibit any traces of them.

"2. Nest of Synagris mirabilis, *Guér. Voy. en Abyss. de Le Fèvre*, vi. *Ins.* p. 359, pl. 8, fig. 8. This nest is much smaller than that of S. calida, and is probably in an unfinished state; its form is somewhat quadrate, with the angles rounded; it contains only two cells, each having, as in the other species, a separate outlet. This nest is constructed of a different-coloured earth, being of the ordinary mud-colour. It is exceedingly interesting to find that the habits of this genus of wasps is similar to that of Odynerus. I have in my possession a nest of O. parietinus formed of earth in a similar manner.

"3. The nest of Eumenes tinctor, *Christ. Hym.* This is a very abundant and

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well-known species. The nest differs from that of every species of this genus with which I am acquainted: all the nests which I have seen are globular, or sometimes flask-shaped, each consisting of a single cell. The only British species, Eumenes coarctata, constructs a small nearly globular nest of mud, forming a single cell; it constructs a separate nest for each individual: these nests I have found in Hampshire, attached to twigs of heath. The nest, however, of Eumenes tinctor is very different; it is pear-shaped and constructed of mud, being three inches and a half long and nine inches in diameter at its widest part, but is considerably narrower at the top and obtuse at the bottom. This nest appears to have been constructed amongst rank grass or reeds, having blades passing through it; by these means it was doubtless held in a suspended position: there are twelve outlets, showing that a number of individuals have issued from it.

"4. Raphigaster Guineensis, *Sauss.* This is the Zethus Guineensis of Fabricius, *Syst. Piez*, 283, 2. The nest of this species consists of a number of exposed cells attached to each other, a slender twig forming the base of attachment; the cells are about an inch in length, and of a very thin papery texture; the number in the nest exhibited is seventeen; there are eight unfinished cells: what may be an average number in finished nests has not been ascertained, but either it must be considerable, or the number of nests very great, as the insect is extremely abundant.

"5. Mischocyttarus labiatus, *Sauss.* Zethus labiatus of Fabricius, *Syst. Piez.* 284, 6. This nest is very similar to the preceding in form and mode of attachment; it is placed upon a slender twig; the texture is, however, very different, being apparently constructed of decayed wood: it is very fragile, and breaks with a slight touch, similar to the cells of Vespa vulgaris: the cells are of a circular form.

"6. Icaria guttatipennis, *Sauss.* This wasp is described in *Mon. des Guêpes Sociales*, p. 40, 19, pl. 5, fig. 8. Its cells are exposed in the same manner as those of a Polistes, and are hexagonal. This nest is of the greatest interest, as exhibiting a direct contradiction to the theory that all cells are originally constructed of a cylindrical form, and that the hexagonal form is attributable to the fact of the insects working in concert in opposite cells, the space between the cells gradually falling into straight sides, thus forming regular hexagons; consequently the outer surface of the exterior cells will be rounded. The nest of this insect exhibits a series of regular hexagons, the outer cells being as sharply angulated as the inner ones.

"7. Eumenes ——— This is a small mud nest, of globular form, about the size of a cherry, adapted to contain a single larva; it is attached to the back of a leaf.

"8. Odynerus ——— This wasp constructs a nest in hollow reeds, lining and separating the cells with red sandy loam, in the same manner as the Odynerus lævipes of Britain.

"9. Pelopæus chalybeus, *Smith, Cat. Foss. Hym.* Part 2. The nest of this insect is especially interesting. The species of the genus Pelopæus are popularly known as mud-daubers in America. They differ in the mode of constructing their nests; some species appear to place single cells in different situations; others construct a number close together, and even one cell upon another. P. chalybeus differs from all the species whose habits have been recorded; it constructs single cells of cow-dung, attaching them to stems of grass. From one of the nests I extracted a perfect specimen of the insect.

"10. Chalicodoma cælocera. This is the Megachile cælocera of my 'Catalogue

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of Apidæ,' published by the British Museum. The genus Chalicodoma of St. Fargeau cannot be maintained upon structural differences: the habit of the species alone entitles it to the rank of a subgenus. These insects construct nests of clay or sandy loam, attaching them usually to walls; a number of cells are formed, and when the whole are furnished with the requisite supply of pollen and honey the cells are closed, and the whole then covered over with a mass of sandy loam. The nest of C. cælocera, which I exhibit to the Society, is of an elongate form, being seven inches in length, two and a half in width, and one and a half in elevation at its greatest convexity; there are seven outlets, from which the bees have escaped; probably there are others which have perished in the cells. The mixture of red earth and small pebbles, of which the nest is composed, is excessively hard, and it must be a task of great labour to the bee before it can perforate so hard a substance; both sexes are therefore furnished with short, exceedingly stout, toothed mandibles for that purpose.

"11. This is the nest of a species of Ceratina, formed in the stem of a shrub which has a large pith in the middle, similar to the common elder of Europe. The channel formed by the bee is three inches in length, exactly similar to that formed by Ceratina cærulea.

"12. Nest of a small species of Anthidium,—A. cordatum, *Smith*. This nest is interesting, as showing a reverse of the habit of the British species of the genus, A. manicatum, which usually selects ready-formed holes in posts or rails; its nests have also been found in the locks of out-houses, &c., always, I believe, in some ready-formed place of security; A. cordatum, on the contrary, attaches its cells to the stems of plants; that which I exhibit consists of two; these are formed apparently of a resinous substance, which melts when heated; outside, the cells are covered with the woolly down of plants.

"13. This is a portion of a dead branch, probably having formed part of some railing or fence, into which Xylocopa trepida has burrowed, the entrance being large enough to admit of the little finger; the diameter of the tube inside is exactly three-fourths of an inch."

Mr. Lubbock read a paper intituled 'On some Entomostraca collected by Dr. Sutherland in the Atlantic Ocean.'

Mr. Westwood read a paper on Cryptodus from New Holland.

Mr. Stainton read a paper on three Indian species of Micro-Lepidoptera bred by Mr. Atkinson.

Mr. Janson communicated some notes on Hygrotus bisulcatus, *Curt.*, and Apion Curtisii, *Kirby*, *MSS.*, of which insects drawings were exhibited at the December meeting, contending, on the authority of Dr. Erichson and subsequent writers, that the first-named species is the Hydroporus unistriatus, *Illig.*; and that, as the late Mr. Stephens had applied the name of Curtisii to a totally different species of Apion, prior to the publication of Mr. Curtis's description of the Curtisii, *Kirby*, *MSS.*, it is evident that a new name must be imposed on Mr. Curtis's insect.

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January 28, 1856.

EDWARD NEWMAN, Esq., F.L.S., Vice-President, in the chair.

The 22nd Anniversary Meeting was held on the 28th instant, at the rooms of the Society, 12, Bedford Row.

Messrs. J. S. Baly, F. P. Pascoe, W. W. Saunders, and G. R. Waterhouse were elected members of the Council, in the room of Messrs. E. Newman, A. F. Sheppard, Edward Sheppard, and S. L. Waring. W. Wilson Saunders, Esq., F.R.S., &c., was elected President; S. Stevens, Esq., F.L.S., Treasurer; and Messrs. J. W. Douglas and Edwin Shepherd, Secretaries.

The Chairman delivered an Address on the affairs of the Society and Entomology in Britain, enumerating the chief subjects brought before the Society during the past year, and the Entomological books published in England during that period The Meeting passed a vote of thanks for this Address, and ordered it to be printed.

A vote of thanks was passed to J. Curtis, Esq., for his services to the Society and his courteous conduct in the Chair; and on the motion of Mr. Westwood, it was resolved that a portrait of Mr. Curtis should be procured and hung up in the Meeting-room.

Votes of thanks were then passed to the Treasurer and Secretaries.

ANNIVERSARY ADDRESS.

GENTLEMEN,

The delivering of an Address, on the occasion of our Anniversary Meeting for the election of officers, seems to have become a prominent as well as permanent feature in the proceedings of the evening. These Addresses should comprise a faithful summary of the entomological doings of our country during the year, having an especial, but not exclusive, reference to the progress of our Society; giving to each branch of the subject its own, and not more than its own, weight and importance; and utterly ignoring every consideration, except the preservation of such a continuous record of progress as shall enable those now at a distance, and all in future years, to see, as in a mirror, a truthful image of the position of the Science in Britain for the time being, and to supply the historian of Entomology with solid and

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trustworthy materials for his structure. Unless this be done not only with regularity, but in a pains-taking, candid and patient spirit, the custom were more honoured in the breach than in the observance. Much has been said of the advantage of giving these Addresses a more catholic character, of embodying in each Address the entomological history of the year. Dr. Schaum attempted this at Stettin, and produced excellent annuals for several successive years; but he has abandoned these, finding the demand on his time greater than he could afford. One great objection to this is its cost; a second, the utter impracticability, as found by Dr. Schaum, of publishing it with punctuality: the scientific publications of other countries reach us only at irregular intervals, and it requires the intervention of an entire year before a complete summary of the preceding year can by any possibility be prepared; but were every country to perform this task for itself, we should thus acquire the materials for a general summary which might be also annual, but always in arrear. Contenting ourselves with the humbler, easier and more restricted task, let us glance, first, at the present state of our Society; secondly, at our public proceedings; lastly, at British publications on Entomology, discarding all distinction between the authors as regards their connexion with our own or other Societies.

Election and Loss of Members.

During the year which terminates this day we have elected twelve members, and have lost only three, thus giving us a clear numerical gain of nine members. The members we have lost are — the veteran apiarian, Dr. Bevan, by resignation, his failing sight having compelled him to give up Entomology as a study; the Rev. Mr. Jarman, by death; and the Rev. Mr. Simkiss, as a defaulter, in whose defence it should, however, be stated that we do not know his residence, or whether he has received our applications for payment of subscription. We have two new subscribers, against four whom we have lost by resignation. The gross gain in numbers is fourteen, and the gross loss seven, leaving a clear balance in our favour of seven. This statement must be received as satisfactory, evincing as it does a continuance of that steady progress which has marked the later years of our existence; and it must be also a cause for congratulation that among the accessions of the year we find the name of Mr. Syme, one of the most acute and learned Coleopterists that this country has produced. We have to lament the death of a foreign member, the

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illustrious De Haan, and to record the election of Professor Pictet, of Geneva, in his stead. We have also lost a corresponding member, Sir T. L. Mitchell.

The following brief memoir of De Haan may not be unacceptable:—

William De Haan died at Haarlem on the 15th of April, 1855, aged fifty-four years. For many years he had been charged with the Curatorship of the Museum at Leyden, which is especially rich in its entomological treasures. His works are not numerous, but embrace a variety of subjects, all of them treated in a manner which displays at once his classical knowledge, and the extent and depth of his zoological studies: the principal of these are enumerated below.

'Mémoires sur les Métamorphoses des Coléoptères,' published in the 'Nouvelles Annales du Museum d'Histoire Naturelle,' 4to, Tome iv., 1836. This was intended as the first of a series of memoirs on the transformations of Coleoptera: it comprises the Lamellicorns, and is illustrated with ten beautiful plates.

'Fauna Japonica — Crustacea elaborata. W. De Haan. Folio: 1835—49.' This splendid volume forms part of Siebold's great work on Japan, published by the Dutch Government. It contains more than seventy plates, the species being all represented of the natural size, and the elementary plates being filled with the most elaborate dissections. The Introduction relates to Crustacea generally, the descriptions only to the orders Decapoda and Stomapoda.

'Bijdragen tot de Kennis der Papilionidæ:' folio: 1840. With nine plates. This is a portion of the great work published by the Dutch Government, on the Natural Productions of its Eastern Possessions, and is confined to the restricted family Papilionidæ, of which a great number of new species are described and excellently figured. The differences of form in the larvæ, and of the wing-rays and genitalia in the imago, are most carefully figured and described, and are availed of in the classification of the species.

'Bijdragen tot de Kennis der Orthoptera:' folio: 1842. With twenty-three plates. This is another portion of the same work, and describes the whole of the Orthopterous insects. The general observations and the tables comprise all the known genera: the plates are equally beautiful with those already noticed, and it may be said that the whole of the plates illustrating De Haan's labours are amongst the most correct, perfect and elegant of any that have been published in the Science of Entomology.

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Colonel Sir Thomas Livingstone Mitchell, Surveyor-General of the colony of New South Wales, died at his residence, Ancona, on the 4th of October last, from the effects of bronchitis, in his 64th year. Sir Thomas Mitchell was an officer of more than forty years' standing. He was on the staff of the Duke of Wellington in the Peninsular war, and received a medal of five clasps for services in the field of battle. He was entitled by seniority to the rank of major-general. He was also the inventor of the Boomerang screw-propeller. As a tribute of respect to his memory the sitting of the Legislative Council was adjourned from Friday, the 5th of October, until the following Tuesday. Sir Thomas was a native of Grangemouth, Stirlingshire, which place he visited shortly before his departure for New South Wales.

State of our Finances.

Nothing so clearly and unmistakably indicates the healthy state of a Society as the gradually accumulating balance in the hands of its Treasurer; in this respect the tide of our prosperity still continues to flow, and the large sum of £75 remains at our disposal: it may truly be said that there are demands on us to the amount of £40, but against this we have half a year's sale of Transactions still to receive, although not reckoned as an asset in the statement you have just heard. It is a matter for grave consideration how this accruing balance can be best appropriated. It is well known that a number of our members have compounded, thus becoming life members, and ceasing to contribute in any way towards our support. Is not the present a suitable time to entertain the question of investing a sum equal to the composition of those living members on whom we have now no claim, and thus assuring a permanent income in lieu of contributions no longer to be levied? The financial object of compounding does not seem to be clearly understood by any of our Societies: it is that the Society may be assured, from any given source, a smaller income for ever, in lieu of a larger income, from the same source, terminable on the death of an individual: the composition money is therefore capital, not income, and every inroad on capital has a direct tendency to depauperate. These observations, although perhaps tending to call in question former financial arrangements of this Society, are nevertheless strictly in accordance with the principles of progress. Since the foundation of the Society we have elected so many members that, had each paid a composition of £10, and had these compositions been invested in a mortgage, we should now be in the receipt of

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£225 to £250 per annum, an income which would not only provide for all our requirings, but would assure the perpetuity of the Society.

Internal Management.

Two other changes in internal management are worthy of your attentive and calm consideration. We have found that the law enforcing a change of President at the end of each second year does not work so beneficially as we hoped and believed it would. The very circumstance that a vacancy of the chair is inevitable induces the friends of every member whose talents, works or position are supposed to qualify him for that honourable post, to seek, by every constitutional means, to place him there; and since many of our members possess one or other of the qualifications in question, there arises of necessity a struggle to attain the object; hence an unkindness towards those opposed to us at the time, and a disappointment at its issue, since one party must always be defeated. These evils are to be avoided by removing the necessity for contest: had we the power to retain a Kirby or a Spence in the chair there is not a member of the Society who would desire a change, until death or infirmity deprived us of his services. The question of re-election should, however, be discussed by the Council every year, and good taste should dictate to the sitting President the propriety of his absence on such occasions. The qualifications for a President are not exclusively in the head: the open heart, the courteous demeanour, the disposition instantly to yield to the wishes of a majority, the maintenance of order, the granting a fair hearing to all, especially to those who from diffidence have not the power of enforcing it, and strict punctuality and business habits in the performance of all its duties, are far more important qualifications for the Presidency than any amount of scientific acquirements. While on this subject a suggestion may also be made on a matter of routine, a slight change in which would render the presidential duty of preserving order much less onerous. It cannot have escaped the notice of members that the introduction of numerous insects for exhibition, immediately after the opening of the meeting, induces us to congregate like moths round the light, and elicits such a buzz of general conversation as to preclude the possibility of hearing any member who may wish to address the chair. Would it not be a better arrangement to read the scientific communications immediately after the confirmation of the minutes, the members remaining seated and [redacted] this, which is really the legitimate business of the

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Society, and the consequent discussion were disposed of, the exhibitions might commence; but insects brought for sale should not be produced until the chair was vacated. While thus attempting to infuse a kind of method into our meetings, it may not be amiss to suggest the removal of seats from the table: in other Societies a space is preserved immediately around the table, to be occupied only as required, by members giving explanations, undergoing the ceremony of admission, and so forth: the plan seems to answer; can we not adopt it?

Our meetings have been kept up with regularity, and have been well attended: no scientific Society in the metropolis can boast of a larger numerical attendance in proportion to the number of our members.

At one of our meetings, convened for the especial purpose, an attempt was made to carry out that portion of our bye-laws which relates to the election of associates: this attempt has been unsuccessful, and has terminated in the expunging such passages as relates associates. On this subject, like that of the Presidency, the Society has been agitated on several occasions, always without good effect, always to its detriment: the minority should now succumb; no one can entertain a wish that they should abandon opinions which they suppose just and liberal, but they should cease to agitate so small a body as ours confessedly is, by throwing an apple of discord amongst us.

Secondly, our public proceedings have possessed considerable interest: let us glance at a portion of them.

Galls of the Oak.

The occurrence in some profusion, in Devonshire, of the ink-gall produced by the Cynips Lignicola of Hartig, is a fact of much interest, and the records of our Proceedings thereon will certainly cause some merriment to future readers. The galls were introduced to our notice by Mr. Rich, a visitor at our November meeting, in 1854: they were in beautiful clusters, and, as you will all recollect, presented a very remarkable appearance. Mr. Curtis said he had paid great attention to the Cynipidæ in general, and to this species in particular, which he had received both from Mr. Rich and Mr. Walcott; and he was convinced that the specimen bred from the galls now exhibited was the true Cynips Quercus-petioli of Linneus.

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The President doubted Mr. Curtis's conclusion, on the ground that each individual gall was situate in the axil of a leaf, and never on a petiole; and he thought so great a botanist as Linneus would not have been guilty of such an obvious misapplication of terms: he therefore inclined to suppose that Linneus was unacquainted with the species. At the December meeting Mr. Stainton read a letter from Mr. Jordan, who claimed the gall as an old acquaintance, stating that years previously it had been gathered in quantities at Lympstone, near Exmouth, and employed in making ink. At the January meeting Mr. Stainton exhibited a bunch of similar galls, gathered from an oak at Exeter, and read a letter from the gentleman who sent them, containing additional information, and showing that Mr. Westwood had examined the perfect Cynips and decided it to be Cynips terminalis. At the April meeting Mr. Curtis read a paper on the subject, citing a number of authorities and reiterating the statement that the insect was the Cynips Quercus-petioli of Linneus; and Mr. Westwood added, that he had decided the insect to be Cynips Quercus-petioli so long ago that the ink with which the name was written had faded. At the November meeting a note was read from Mr. Haliday, stating that the Cynips could not be identified as either a Linnean or Fabrician species, but was the Cynips lignicola of Hartig, and the only one of that group to which the ink-gall belongs that has occurred so far North as England, or even as Northern Germany. Lastly, at the December meeting, an extract from the 'Gardener's Chronicle' was read, in which the author restores the name of Quercus-petioli: his statements as regard the insect are somewhat conflicting;—that it kills oak trees at Weston-super-Mare; that it keeps the oak trees in plantations in a dwarf state; and that it is of very recent origin: when we consider the slow growth of the oak, the first observation, which certainly implies a long-continued observation of the gall, seems at variance with the last. After smiling at these clashing decisions, all of them apparently considered final by their enunciators, let us pause for a moment on the insect itself: we have abundant evidence before us of the production, in immense quantities, and in our own country, of an ink-gall the properties of which have been tested and found excellent. What a subject for a prize essay is here! What a theme for investigation! It is to be hoped that another year will not pass away without the publication of good figures, a good description of the insect and its habitation, a careful investigation of its geographical range, and at least an attempt to prove its value as an article of commerce: it is within the range of possibility, even of pro-

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bility, that we shall no longer be dependant on foreign countries for our ink. But neither good nor evil is unmixed: if we gain ink wherewith to record these phenomena, we lack the customary stock of acorns, a fact which having been pointed out to our Devon farmers, they already tremble for their pigs.

Silk-producing Insects.

It will be seen recorded, in the last Anniversary Address, that, at the January meeting of 1855, the President exhibited a specimen of silk felt, produced at Vienna by the larvæ of Saturnia Spini: he described it as impervious to water, and detailed the manner in which the insects were managed to ensure its production: in connexion with this subject he subsequently stated that an Austrian patent had been taken out for the manufacture of this felt into hats. At the June meeting Mr. D'Urban exhibited cocoons, in various states, of Saturnia cecropia, a North-American species of great beauty, and recommended its introduction into England as a valuable silk-producing insect: it was capable of withstanding the effects of severe cold, and its food plants (Prunus pennsylvanica and P. serotina) grew freely in this country.

Bird-eating Spiders.

At the May meeting was read a portion of a letter from Mr. Bates, in which he positively states that he found two finches, one of them dead and the other nearly so, in the web of a huge Mygale, on the trunk of a tree: he further states that there are, in the same district, vast numbers of Caprimulgidæ and ground doves which lay their eggs on the ground: he states further, from actual observation, that the Mygales are strictly nocturnal animals, concealing themselves in deep burrows in the earth by day, and he thinks they feed on the birds themselves and their eggs. Much as we are indebted to Mr. Bates for these interesting observations, we cannot but observe that both the observations and the reasoning are somewhat incomplete: for instance, the fact of the finches being entangled in the web, and in the presence of the spider, yet without any web being wound round them, and without any noticed injury to their bodies, has rather the appearance of an accidental occurrence than a design: again, Mr. Bates's assertion that these spiders are nocturnal animals, carefully secreting themselves in burrows by day and roving about only at night, is an assertion supported by the concurrent evidence of Humbo[illegible]

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and other most accurate observers, — does not support the theory of their feeding on finches, which are arboreal and strictly diurnal birds. No one will question the statements made by Mr. Bates, but the cautious mind of a naturalist seems disposed to exercise a right of private judgment on his inferences.

Honey Bees.

At the January meeting Mr. Downie exhibited a model of a wooden bee-hive, containing the following improvements: 1st, a moveable floor, affording the opportunity of removing dead bees in winter without admitting cold; 2nd, certain openings below the false floor and at the top of the hive, which might be closed at pleasure, and by which ventilation was at all times practicable; 3rd, a shallow zinc feeding-trough, at the side of the moveable floor. At the February meeting some extracts were read from Webster's 'Voyage of the Chanticleer,' and also from a private letter, showing that an undescribed honey bee of considerable commercial importance exists abundantly in Cape Colony, and voluntarily seeks the homesteads of the Dutch Boors for purposes of nidification. At the same meeting a note was read from Mr. Muskett, of Norwich, describing the common toad as a great enemy to bees, and relating a circumstance of the green woodpecker devouring them: in connexion with this fact, Mr. Westwood remarked that sparrows in the breeding-season ate bees with avidity. Subsequently, in the 'Zoologist' (Zool. 4738), Mr. Smith published a communication showing the toad had long since been placed at the head of the enemies of the honey bee. At the April meeting a paper was read by Mr. Desborough, in continuation of his prize essay on the 'Duration of Life in the Honey Bee.'

Greasiness of Insects in Cabinets.

At the March meeting Mr. Douglas read a short paper on greasiness in insects, which Zeller and other continental entomologists were inclined to attribute to the use of camphor so universal in England. A discussion ensued, in which doubly gilt pins, electro-plated pins, and the use of quicksilver loose in the drawers, were severally recommended as remedies. The subject was renewed and re-discussed at the April meeting. At a subsequent meeting Mr. Stevens recommended a new chemical, borneote of petroline, as effectual in [illegible] from insects.

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Micro-Lepidoptera in the Tropics.

A communication from Mr. Wallace was read, stating that in Borneo he found Micro-Lepidoptera come in great numbers to a lamp, on dark and wet nights, and expressing a belief that he could obtain thousands of specimens. At the May meeting Mr. Stainton adduced evidence of the existence of mining Micros in the vicinity of Calcutta. Mr. Saunders said, that when in India he also had observed the mines of Micros in leaves.

New, or New British, Species.

At the April meeting was read a description, by Mr. Wallace, of Ornithoptera Brookiana, a magnificent new species, captured near the Rejang River, on the North-west coast of Borneo.

At the May meeting a new Noctua was described by Mr. Doubleday, under the name of Agrotis Ashworthii: it was discovered at Llangollen, in North Wales, by Mr. Ashworth, in 1853, and has been recorded on several occasions under the name of Spælotis vallesiaca, to which insect it has little similarity, and which name must be expunged from our lists.

At the August meeting Mr. Doubleday sent for exhibition specimens of Caradrina blanda and C. Alsines, two perfectly distinct species of Noctuina, which had previously been mixed in all our collections under the name of C. blanda. The name of Caradrina Alsines occurs both in Stephens' 'Catalogue' and 'Illustrations,' but is omitted altogether in Henry Doubleday's 'Synonymic List;' and the name was again introduced, but only as a variety of C. blanda, in Stephens' 'Catalogue of the British Lepidoptera in the British Museum:' a species is therefore added to our list of British Lepidoptera.

At the November meeting Mr. Stevens exhibited a new British Tortrix, recently taken at Hayling Island, Hants, among the spurge which grows on the coast near Havant: for this insect he proposes the name of Mixodia Hawkerana.

At the October meeting Mr. Stainton exhibited specimens of Lithocolletis Bremiella, which he had bred from the mined leaves of Vicia sepium, gathered at Bexley a few days previously.

At the October meeting Mr. Charles Wood, of Dulwich, sent for exhibition a specimen of Xylocopa violacea, captured in a greenhouse on Dulwich Common: it had entered the green-house attracted

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by the flowers. It was suggested that this wood-boring bee might have been introduced with the orange trees imported in such abundance by the Crystal Palace Company, but it is one by no means unlikely to occur in England, since it is indigenous to the opposite coast of France, and sometimes abounds there. In the vicinity of Paris it is esteemed a common bee: its large size, unusual colour and sonorous hum are sure to attract the notice of entomologists visiting the beautiful gardens of that city.

At the August meeting Dr. Power exhibited a specimen of Dinodes Maillei of Dejean, taken by Mr. Arthur Adams, among moss, at Gurnard Bay, in the Isle of Wight. Considerable discussion followed as to the propriety of adding this Morean beetle to the British list: every member who expressed an opinion doubted its claim to be considered British, but all appeared to forget that moss is the most improbable locality in which an accidentally imported insect could possibly be found.

At our January meeting Mr. Douglas exhibited a specimen of Cratonychus castanipes of Paykul, one of the Elateridæ, which he had found in a mass of Fungus: the species was previously unrecorded as British.

In this summary the more important papers are omitted, because noticeable as published works, which we now proceed to consider.

Hewitson's 'Exotic Butterflies.'

Mr. Hewitson's beautiful work on Exotic Butterflies is continued with regularity; four numbers have appeared during the year. In this work there is a truthfulness of outline, an exquisite delicacy of pencilling, a brilliancy and transparency of colouring, that has rarely been equalled and probably never surpassed. The sequence of species is irregular, but the species figured on each plate are of the same genus, so that, in binding, the whole may be arranged systematically. During the past year the families Nymphalidæ and Heliconidæ are combined in each number: in Nymphalidæ we have eleven species of Catagramma, one of Agrias, and one of Nymphalis; in Heliconidæ we have forty-nine species of Ithomia and four of Mechanitis; in Papilionidæ, three of Papilio; in Erycinidæ, seven of Eurygona.

Walker's Museum Catalogues.

Four Parts (III., IV., V. and VI.) of the Museum Catalogue of Lepidoptera Heterocera have been published during the year, all of

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them from the unwearying pen of Mr. Walker. Part III., published in May, contains characters of two hundred and ninety-nine species of Arctiidæ, of which one hundred and fifty-four were previously undescribed. Part IV., published in July, contains characters of three hundred and forty-eight species, of which two hundred and forty-seven are Liparidæ, and one hundred and one Psychidæ: among the Liparidæ are one hundred and sixty-nine and among the Psychidæ thirteen species previously undescribed. Part V., published in October, contains characters of three hundred and seventy-seven species, of which one hundred and thirty-five are Notodontidæ, one hundred and twenty-four Limacodidæ, fifty-four Drepanulidæ, and sixty-four Saturniidæ: of this number seventy-four species of Notodontidæ, seventy of Limacodidæ, thirty-four of Drepanulidæ and fifteen of Saturniidæ are now described for the first time. Part VI., published in December, contains characters of three hundred and forty-three species, of which one hundred and forty-eight are Saturniidæ, two Endromidæ, and one hundred and ninety-three Bombycidæ: seventy-two of the Saturniidæ and eighty-six of the Bombycidæ are new to Science. The total number of described species is thirteen hundred and sixty-seven, and of new species six hundred and eighty-seven.

One Part of the Museum Catalogue of Diptera has been published during the year: it is Part VII. or Supplement III., is dated March, 1855, and, like the preceding Parts, is written by Mr. Walker. This Part contains a list of eight hundred and seventy-four species of Asilidæ, fifty of which are new to Science. The whole of the number are described, with the exception of those published in the previous Parts of the Catalogue, or in the 'Insecta Saundersiana.'

'*Natural History of the Tineina.*'

The 'Natural History of the Tineina,' by Messrs. Stainton, Douglas and Zeller, is a work of interest and value: the plates, or at least many of them, possess great merit, and bring vividly before us the excellences and the remembrance of that talented young artist whose death cast a gloom over our last Anniversary. This work also affords another and pleasing instance that economy and natural history are now rising amongst us to their proper station in the Science of Entomology: the species described and figured are twenty-four in number; twenty-one of them belong to the genus Nepticula, and three to the genus Cemiostoma.

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Smith's 'History of the British Bees.'

Mr. Smith's 'History of the British Bees,' another of the Museum Catalogues, is the best Entomological Monograph in the English language. How few could have ventured on a subject where a Kirby had preoccupied the ground with such unquestionable success! The secret of Mr. Smith's still greater success is the result of combined causes: in the first place the celebrated 'Monographia' is deficient in the association of the sexes, a point on which Mr. Smith is particularly strong, his knowledge being the result of indefatigable observation on the living bees: secondly, the Kirbyan specimens, now in our possession, were comparatively few in number, and generally speaking in such a faded and dilapidated condition that it seems a perfect marvel that minute and really classical descriptions could ever have been drawn up from such indifferent materials; Mr. Smith, on the contrary, has an almost unlimited access to materials, for not only his own but other cabinets may be said to be redundant with specimens in the highest possible state of preservation: lastly, Mr. Smith is peculiarly happy on the subject of economy, his details being ample and precise, his generalisations masterly and lucid: in this respect the 'Monographia' is deficient, the economy of many parasitic species being at that early period altogether unknown. It is a threadbare and commonplace axiom that "comparisons are odious;" but in this case surely it is not so, and, were the father of Entomology in Britain still amongst us and with us, he would be the first to render the just mede of praise to a pupil who bids fair to transcend the master's excellence.

'Transactions of the Linnean Society.'

The Linnean Society has published one Part of its 'Transactions,' containing one entomological paper, intituled a "Monograph of the Leucosiadæ, with Observations on the Relations, Structure, Habits and Distribution of the Family; a Revision of the Generic Characters; and Descriptions of New Genera and Species. By Thomas Bell, President." This family, which Professor Bell considers as the most isolated among the decapod Crustacea, contained up to the time of his Monograph but twenty-nine species: these are described by Milne-Edwards, in his recent admirable volume on Crustacea; by De Haan, in his history of the Crustacea of Japan; and by Messrs. Adams and White, in their descriptions of the Crustacea collected in the

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Voyage of the Samarang: the author has added thirty-six others, his total number being sixty-five comprised in eighteen genera. The descriptions are written with great care, perspicuity and elegance, and the paper is profusely illustrated with lithographed figures by Mr. G. B. Sowerby, forty-one of the species being figured. The new species are—Leucosia orbicularis from Australia, L. pallida from the Eastern Archipelago, L. obscura from the Philippine Islands, L. marmorea from the Philippine Islands, L. punctata from the Indian Ocean, L. affinis from the Philippine Islands, L. brevimana from the Philippine Islands, L. margaritacea from the Eastern Archipelago, L. Whitei from the coast of Australia, L. Cumingii from the Philippine Islands, L. pulchella from the Chinese Seas, L. phyllocheira from the Island of Borneo, Persephona orbicularis from Valparaiso, P. Edwardsii from the Galapago Islands, Myra affinis from the Philippine Islands, M. elegans from the Eastern Archipelago, M. mammillaris from the coast of Australia, Myrodes eudactylus from the Philippine Islands, Philyra lævis from Adelaide, P. Adamsii—habitat unknown, P. punctata from the West coast of Africa, P. carinata from the Island of Borneo, P. macrophthalma from the Indian Ocean, Phlyxia crassipes from the Eastern coast of Australia, P. lambriformis from the Eastern coast of Australia, P. lævis from New Zealand, Lithadia Cumingii from the coast of Central America, Oreophorus nodosus—habitat unknown, Nursia abbreviata from the Indian Ocean, Nursilia dentata from the Indian Ocean, Arcania septemspinosa—habitat unknown, A. tuberculata from the Island of Borneo, A. gracilipes from the Island of Borneo, A. lævimana from the Philippine Islands. The new genera are five in number—Leucosilia allied to Persephona of Leach, Myrodes allied to Myra of Leach, Phlyxia and Lithadia allied to Ebalia of Leach, and Nursilia allied to Nursia of Leach.

Illustrated 'Proceedings of the Zoological Society.'

In the 'Proceedings of the Zoological Society' Mr. Westwood has the following papers:—"Descriptions of some Species of Lepidopterous Insects belonging to the Genus Oiketicos, chiefly from New Holland:" this paper is accompanied by four plates of transformations. "Descriptions of some New Species of Cleridæ collected at Singapore by Mr. Wallace:" accompanied by one plate, containing twelve species. "Descriptions of some New Species of Exotic Moths mostly belonging or allied to the Genus Saturnia:" eleven species are described, accompanied by two plates.

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'Transactions of the Entomological Society.'

Our own 'Transactions' have appeared as usual, four Parts having been published during the year, thus proving the abundance of papers which have been judged worthy of publication by the entomologists to whom they have been referred. The papers in these four Parts are twelve in number: three treat of Hymenoptera, six of Coleoptera, one of Crustacea, one on "Entomological Difficulties," for which it is difficult to find a less difficult title, and one on Structure: unless that on "Difficulties" may be called Lepidopterous, there is not one on Lepidoptera, Diptera, Orthoptera, Hemiptera or Neuroptera: dividing them by other characters, eight are descriptive of species, one is statistical, two critical and one physiological. Two of the papers on Hymenoptera are from the pen of Mr. Smith, and one from that of Mr. Desborough; three of those on Coleoptera are by Mr. Westwood, one by Mr. Baly, one by Mr. Janson, and one by Messrs. Waterhouse and Janson: the contribution on Crustacea is by Mr. Lubbock, and for "Difficulties" the Society is indebted to the admonitorial kindness of Mr. Stainton. Mr. Smith's papers are intituled as under:—"Essay on the Genera and Species of British Formicidæ," and "Descriptions of some Species of Brazilian Ants belonging to the Genera Pseudomyrma, Eciton and Myrmica." In the first of these the author describes seven species of Formica, two of Tapinoma, one of Ponera, fourteen of Myrmica, one of Myrmecina and one of Stenamma. Two only of these species are new to Science,—Tapinoma polita, captured in Wales by Mr. Dale, in whose rich cabinet it is unique, and Myrmica lævigata, captured by the author at Battersea. In the second paper Mr. Smith describes nine species of Pseudomyrma, eight of which are new; eight of Eciton, four of which are new; and one of Myrmica, named M. sævissima. Of the excellency of Mr. Smith's descriptions it is quite superfluous to speak; but it may be allowable to invite attention to the highly interesting details of economy, from the pen of Mr. Bates, with which the second paper is interspersed. Both the papers are accompanied by uncoloured plates, containing outline figures of species and a great variety of anatomical details.

Mr. Desborough's paper is intituled "Observations of the Honey Bee, in Continuation of the Prize Essay of the Entomological Society for 1852."

Mr. Westwood's papers are—1. "Descriptions of Four Species of Beetles belonging to the Family Paussidæ:" these are Paussus

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pacificus from Ceylon; P. Degeeri, P. Afzelii, P. Bohemani—all from Caffraria. 2. "Description of a New Genus of Coleopterous Insects inhabiting the interior of Ants' Nests in Brazil:" the insect is Gnostus Formicicola, found by Mr. Bates. 3. "Descriptions of some New Species of Lucanidæ:" these are Colophon Westwoodii, *G. R. Gray*, C. Thunbergii supposed to come from Caffraria, Lucanus thibeticus from Thibet, L. biplagiatus from Thibet, Odontolabris Evansii from China, O. emarginatus, *W. W. Saunders*, Cladognathus piceipennis from China, C. gracilis, *W. W. Saunders*, Sclerostomus hastatus from Central South America, S. Neotragus from Brazil, S. ditomoides from Brazil, S. costatus, *Burmeister*, from Brazil, S. femoralis, *Guérin-Meneville*, Scorzinus maculatus, *Klug*, Cacostomus squamosus from New Holland, Sclerostomus caviceps from New Zealand, Lissotes Menalcas from New Holland, L. cancroides, *Olivier*, from Van Diemen's Land, L. subtuberculatus from New Holland, L. crenatus from New Holland, L. obtusatus from Van Diemen's Land, L. reticulatus from New Zealand, Dorcus luteus from New Holland, Figulus lilliputanus from Adelaide, and Dorcas pelorides from Moreton Bay. The paper is accompanied by uncoloured figures of nineteen species and numerous anatomical details.

Mr. Baly's paper is a "Monograph of the Australian Species of Chrysomela, Phyllocharis and Allied Genera." It contains the characters of five genera, two of which are new, and twenty species, eleven of which are new: the new genera are—Lamprolina, separated from Phyllocharis of Dalman, and Eulina, allied to but never united with the same genus: the new species are—Phyllocharis Leoparda from Moreton Bay, P. cyanipennis from Port Essington, P. flexuosa from Moreton Bay and Melbourne, Lamprolina grandis and L. simillima—habitat unrecorded, and L. puncticollis from Richmond River, Eulina Curtisii—habitat unknown, Chalcolampra pustulata from Melbourne, C. thoracica from Adelaide, C. chalybeata from Van Diemen's Land, and C. simillima from Swan River. The paper is accompanied by coloured representations of nine of the species.

Mr. Janson's paper has this title—"Observations on the Species of Elateridæ described by Mr. Curtis in the First Part of the Third Volume of the New Series of the Transactions of the Entomological Society of London." This paper is, as its title implies, of a critical character: it points out that the Ectinus? gagates of Curtis is the Ampedus lugens of Redtenbacher; Elater nigrinus of Curtis is Ampedus nigrinus of all Continental authors; Aplotarsus maritimus of Curtis is not an Aplotarsus at all, but probably referrible to the genus

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Cardiophorus; Cardiophorus formosus of Curtis is probably a variety of C. 6-punctatus of Illiger; and finally, Aplotarsus? cothurnatus of Curtis is the Ampedus subcarinatus of Germar. Although no one will attempt to deny the utility of pointing out errors such as appear to exist in Mr. Curtis's contribution to our 'Transactions,' yet we cannot but lament that Mr. Janson does not employ the great knowledge he appears to possess of our Elateridæ in redescribing the species and reforming the nomenclature of the entire group, rather than in selecting, from what is probably a mass of error, certainly to moderate capacities a mass of confusion, a few examples of error or confusion, the exposition of which may possibly appear somewhat invidious.

The title of the very useful paper by Messrs. Waterhouse and Janson is sufficiently explanatory—"On the British Species of the Genus Stenus; with Notes on the Species of Stenus described by Kirby, and in the Illustrations of British Entomology by Mr. Stephens; together with Observations on the Specimens in Mr. Stephens' collection." It is impossible to peruse this careful and laborious, but most unpresuming contribution to Science, without experiencing feelings of gratitude to the authors for the able manner in which their task is performed, and also of the deepest regret that Mr. Kirby's descriptions, written in the early part of the present century, were never published: not only would they have proved a proud monument to the author's genius and industry, and a rich boon to the student, but, being long antecedent to the recent writers on the Staphylinina, they would, as a matter of course, have saved us from that all but inextricable confusion which entomologists are now so laboriously attempting to unravel. This paper adds no less than twelve species to our British Steni, all of them previously captured, but now for the first time made known: these are as under:—Stenus asphaltinus, *Erichson*, found by Mr. Waterhouse in a chalk pit at Greenhithe, and by Mr. Janson in a chalk pit at Charlton, in May. S. ater, *Mannerheim*, found at Greenhithe by Mr. Waterhouse, in June. S. morio, *Erichson?* a single specimen taken by Mr. Janson running on the muddy bottom of a water-course in a wood near Highgate, on the 28th of August, 1854. S. incrassatus, *Erichson*, found by Mr. Waterhouse on Wandsworth Common, in June; and shaken from moss on Wimbledon Common, in the winter. S. opacus, *Erichson;* two specimens are in the cabinet of Mr. Waterhouse, which he believes were taken in Northumberland. S. exiguus, *Erichson*, found by Mr. Wollaston at Spridlington, in Lincolnshire, and at Rosnalee, in the county

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of Cork. S. providus, *Erichson*, found by Mr. Wollaston at Whitlesea Mere, in the Isle of Wight, and at Cransley; by Mr. Waterhouse, in January, in moss from Wimbledon Common; and by Mr. Janson at Colney Hatch and Finchley, among moss, late in the autumn and winter. S. Argus, *Gravenhorst*, found by Mr. Wollaston at Spridlington. S. geniculatus, *Gravenhorst*, found by Mr. Wollaston at Slayford Bridge, in Hampshire. S. flavipes, *Erichson*, found by Mr. Janson at Colney Hatch and at Finchley, in moss, in winter and early spring; and by Mr. Guyon at Shanklin, in the Isle of Wight, in moss. S. fuscicornis, *Erichson*, found by Mr. Waterhouse at Greenhithe. S. latifrons, *Erichson*, found by Mr. John Curtis in the New Forest; and by Mr. Janson at Colney Hatch, in moss, in February. It is singular that throughout the able paper from which these extracts have been made there is no reference to the grass in ponds as a habitat: in such situations the Steni are so abundant that the net of the Hydradephagist will sometimes seem "all alive" with them.

Mr. Lubbock's paper, on the Freshwater Entomostraca of South America, contains characters of ten described and four new species: the previously known species were described by Baird, Dana and Gay; the new ones are Cypris australis, C. brasiliensis, Diaptomus brasiliensis, and Daphnia brasiliensis: all these were collected by Mr. Darwin, in 1833.

'*Annals and Magazine of Natural History.*'

Three entomological papers have appeared during the year: the titles are as under:—

1. "Monograph on the British Species of Phalangiidæ or Harvestmen. By R. H. Meade, F.R.C.S." Mr. Meade has done us good service by the publication of this Monograph: it is careful, lucid, and conscientiously accurate; it describes five species of Phalangium, one of which, Phalangium minutum, is new: a new genus, Megabunus, is described, containing two species, one of which, M. insignis, is new; four species of Opilio, one of which, O. agrestis, is new; one of Leiobunus; two of Nemostoma; and one of Homolonotus.

2. "On the Homologies of the Carapace, and on the Structure and Functions of the Antennæ in Crustacea. By C. Spence Bate, Esq." The Crustacea, as is well known, have two pairs of antennæ. "The question we have to consider," says Mr. Bate, "is to which sense either of these two sets of organs belongs; whether the upper belongs to the auditory and the lower the olfactory, as I shall endeavour to

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prove, or *vice versâ*, as maintained by Milne-Edwards." It is very agreeable to see this question again brought under discussion, and many will take deep interest in the argument who may not altogether coincide in the conclusion.

8. "Descriptions of Two newly-discovered Species of Arachnida. By John Blackwall, F.L.S." These are Ciniflo humilis, of the tribe Octonoculina and the family Ciniflonidæ; and Neriene affinis, of the same tribe and the family Linyphiidæ: both were discovered by Mr. Meade, the former in Buckinghamshire, in August, 1854; of the latter two adult males have been taken, one in the vicinity of Burton-on-Trent, the other at Hornsea, near the east coast of Yorkshire.

The 'Zoologist.'

The 'Zoologist,' as usual, has contained a variety of miscellaneous and interesting matter. One of the subjects seems to have excited unusual interest—the question whether there are one or two broods of Gonepteryx Rhamni in the year: there has been a regular passage of arms between the observers and the logicians on this *quæstio vexata*, all the contributions of the former tending to show that it *is* single-brooded, all those of the latter clearly demonstrating that it *ought to be* double-brooded: the logicians in the end appeared to yield to the observers. Such discussions may possibly be carried too far, and the real question at issue lost in a fog of words; but there can be no doubt that facts are elicited by the open avowal of opinions, and, however opposite these may appear, the truth-seeker generally obtains his end through the medium of free and good-humoured controversy much more readily than by adopting positive statements put forth with every appearance of infallibility, although copied from time immemorial from authors of the best repute. Mr. Stainton has continued his Entomological Botany, five interesting portions of which have appeared. The Rev. Hamlet Clark and Mr. John Curtis have published papers on the British carnivorous water-beetles; the former with a view to a future Monograph; the latter recording habitats observed in the earliest days of his entomologising. Neither of these papers makes any addition to our list of British species. Mr. Wollaston has made known three Coleopterous insects new to the British Fauna; Hydroporus elongatulus of Sturm, discovered by himself on Midgley Moor, Yorkshire; Homalota cambrica of Wollaston, also discovered by himself in North Wales; and Corticaria borealis of Wollaston, first discovered by Mr. Darwin, and subsequently by Hardy, on the coast

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of Durham. Mr. Guyon describes a Coleopterous insect entirely new to Britain,—the Tomicus bispinus of Megerle: he found it on the palings of lhe Union Workhouse at Richmond, in Surrey. Mr. Weaver has taken, in North Wales, a number of specimens of Rhizotragus ochraceus: two or three old and doubtfully British examples of this insect previously existed in Britain, under the name of Amphimalla Fallenii. Mr. Janson, our Curator, is the fortunate captor of a species of Adelops, a most interesting genus entirely new to the Fauna of Britain. Colymbetes pulchellus of Heer, captured by Mr. Wailes, in Loch Lomond, has been added to our water-beetles, but, on the other hand, Colymbetes dispar of Bold is shown to be precisely identical with C. uliginosus of our cabinets, although not of Linneus. In Lepidoptera some beautiful additions to the British list have been recorded; Callimorpha Hera, a single specimen of which was taken by Mr. J. J. Reeve, on the 5th of September, 1855, at Newhaven, on the coast of Sussex,—the specimen is now in the collection of Mr. H. Cooke, of Brighton; Phlogophora empyrea, five specimens of which were captured in October, at Brighton, by Mr. Winter,—they were attracted by sugar; Trochilium scoliæforme, several specimens of which were captured by Mr. Ashworth, near Llangollen, in North Wales, and first erroneously recorded under the name of T. sphegiforme: on the other hand, Mr. Dale reduces our list of British Lepidoptera, by stating that Arcturus Sparshallii of Curtis is Australian; but the series of this insect in the cabinet of the British Museum are labelled, and apparently with correctness, as from South America. Three new species of Australian insects are also described; two of the Coleopterous genus Deretaphrus, allied to Colydium,—D. Wollastoni and D. Erichsoni; and one Lepidopterous insect, Bombyx Oxleyi, brought in the cocoon from Mount Alexander, thus affording the clew, so often wanting in exotics, to the connexion of the preserved specimen with some history of its economy. In several numbers of the 'Zoologist' a growing disposition has been manifested to reprobate the dishonest practice of passing off European specimens of reputed British insects for really indigenous ones: this disposition is most laudable, and it is to be hoped that hereafter every entomologist may be brought to regard with abhorrence all such frauds on Science.

The 'Natural-History Review.'

The work does not contain original communications, but reports, in a correct and useful manner, the Proceedings of all the Irish Natural-

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History Societies. From this Journal we learn that Mr. Haliday has discovered the Gyrinus celox of Schiödte, at Blarney Lake; Trichopteryx suffocata of Haliday, found in October, the larva and perfect insect in company, under damp fallen leaves or stones, on the bed of a dried brook tributary to the Shounach river; T. mollis of Haliday, on sandy coasts in Ireland, rather rare; Ptilium angustatum of Erichson, in Ireland, rare; P. coarctatum of Haliday, taken by himself at Holywood, rare; and P. clandestinum of Haliday, taken at Holywood by the author, and in England by Mr. Curtis: this latter insect seems to be excessively rare, but Mr. Haliday observes that from its extreme minuteness it may easily escape observation: Corticaria cylindrica of Mannerheim is also introduced by Mr. Haliday as a novelty, but Mr. Janson subsequently, in the 'Entomologist's Annual,' suggests that Mr. Haliday's insect may be identical with the C. borealis of Wollaston, already noticed. One Hemipterous insect, of the family Lygæidæ, is described as new to Britain,—Dipsocoris alienus of Haliday, the Cryptostemma alienum of Herrich-Schæffer, found on the banks of rivers in Ireland, throughout the summer, gliding on wet gravel; five Dipterous insects; Clunio marinus, a new genus and species of Chironomidæ, found on gravelly sea coasts below high-water mark, walking with its wings half raised and in rapid vibration, without taking flight; Dolichopus prætextatus and Aphrosylus celtiber, of the family Dolichopidæ; Geomyza cingulata, of the family Muscidæ; and Canace nasica, of the family Ephydrini.

In the July number are some interesting remarks on the natatorial structure and habits of two species of Phytobius, found at Holywood on submerged plants of Myriophyllum and Zannichellia.

The 'Entomologist's Annual.'

A second number of the 'Entomologist's Annual' has appeared, giving a useful *resumé* of the entomological captures of the year, with descriptions of species which are new either to Science or to this country. As a matter of course the discoveries among the Tineina greatly preponderate, as is always the case when the attention of the many is once directed into a new or a long-neglected channel. The actual additions to the British list are, in Lepidoptera, Dosithea eburnata of Wocke, taken by Mr. Weaver in Wales; Dosithea circuitaria of Hübner, taken by Mr. Hunter in London; Botys decrepitalis of Fischer, taken by Mr. Hodgkinson, but the locality not mentioned; Chilo obtusellus, taken by Mr. Buxton and Mr. George King at

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Horning Fen, in Cambridgeshire; Retinia duplana of Hübner, discovered by Mr. Bouchard in Scotland, and subsequently bred by Mr. Scott from a bud of the Scotch fir, the locality not recorded; Argyrolepia maritimana of Guenée, discovered by Mr. Harding on the coast near Deal; Cleodora striatella of the Vienna Catalogue, taken by Mr. Stainton, at light, on the 11th of August; Coleophora squamosella of Stainton, taken by Mr. Douglas in Headley Lane, near Dorking, in 1851; Coleophora siccifoliella of Stainton, the locality unrecorded; Asychna profugella of Zeller, taken by Mr. Winter at Woodlands Manse, Kemsing, Kent, in the third week in July, flying in the sun, over a chalky bank clothed with a variety of vegetation, among which Origanum vulgare and Helianthemum vulgare abounded; Elachista flavicomella of Stainton, taken by Mr. Shield, at Howth, in Ireland, on the 15th of July, among grass under brambles; Nepticula cryptella of Frey, discovered by Mr. Douglas in Headley Lane, by sweeping the grass; N. betulicola of Stainton, of which Mr. Douglas is also the discoverer, having found the larvæ mining the leaves of birch trees, in Headley Lane, in October, 1854; N. continuella of Stainton, bred by Mr. Stainton from larvæ found mining the leaves of birch trees, at Lewisham, in September, 1854; N. alnetella, bred by Mr. Stainton from larvæ found mining the leaves of the alder, near Beckenham, in Kent, in October, 1854, and found also by Mr. Thomas Law, of Darlington; Pterophorus Zetterstedtii of Zeller, discovered by Mr. Boyd at Lynmouth, North Devon; and P. plagiodactylus, taken in Wales by Mr. S. C. Gregson, in July, 1853, taken also in Cumberland in 1855. In Coleoptera we have but one addition noticed, Dyschirius elongatulus of Dawson, discovered by Mr. Syme, in April, 1855, on a damp spot of ground near Sandown Castle, Deal, beneath stones, and in company with a number of D. salinus. Mr. Janson enumerates and classifies the captures in Coleoptera already noticed, and on the other hand adduces reasons for erasing six species from the British list: these are Myrmedonia funesta of Gravenhorst, Pella funesta of Stephens, Gymnusa brevicollis of Paykul, Euryporus picipes of Paykul, Stenus æmulus of Erichson, and S. vafellus of Erichson. In Hymenoptera we have two additions: Pompilus notatus, separated by Wesmael from P. exaltatus; and Mimesa Dahlbomi of Wesmael, separated by Mr. Smith from the series of Mimesa unicolor in the Stephensian cabinet.

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The 'Gardener's Chronicle.'

In the 'Gardener's Chronicle' Mr. Westwood has continued his papers on Economic Entomology, with figures of the British ink gall, the gooseberry saw-fly and its caterpillar, the Chrysanthemum field-bug and the Seychelles Dorthesia.

Royal Society's Medal.

A circumstance yet remains to be noticed connected with the entomological bibliography of our country, — the presentation, by the Royal Society, of one of its gold medals to our friend and fellow-member Mr. Westwood. In this act the Royal Society has done honour to itself in thus admitting the claim of Entomology to a place in the List of Sciences, and equal honour to Mr. Westwood, in acknowledging and rewarding the invincible industry which he has displayed during the past and many preceding years.

Conclusion.

Considered as a whole the entomological publications of 1855 do credit to the country in which we live, and no feature is more agreeable than their variety: descriptions of species and observations on habit rival each other in the amount of notice they have obtained: Lepidoptera, Diptera, Hymenoptera and Coleoptera have obtained almost equal attention; Crustacea and Arachnida have been brought prominently forward; and insects of all classes have been collected abroad by our corresponding members, Messrs. Wallace and Bates. There is, therefore, every ground for satisfaction at the progress we are making, every reason for believing that entomology is progressing and will progress amongst us, not perhaps to take a station by the side of astronomy, mathematics or general physics, neither to be lauded as eminently utilitarian; but to be cherished as affording healthful occupation both to mind and to body, and as calculated to induce those habits of correct observation and lucid definition which are constantly available in every walk of life.

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Report of the Library and Cabinet Committee adopted as the Report of the Council for 1855.

The Library and Cabinet Committee have directed their special attention to the Society's collection of exotic insects, and the following considerations present themselves:—

That the collection from its commencement never was thoroughly arranged, and every successive donation has only added to the original evil, so that the insects are now to a great extent without order and without names.

That in this condition the collection is useless to entomologists and a stigma upon the Society, besides being the cause of much trouble and expense, merely to preserve it from destruction.

That from time to time efforts have been made to obtain assistance from Members of the Society in the work of classifying and naming, which is so entirely beyond the powers of a Curator, who has other duties to perform during the limited period of his attendance; but hitherto these appeals have met with little or no response, and it could scarcely be expected that any individuals would give up so much of their time as would be requisite.

That to employ competent persons to arrange and name the foreign collections would occasion great expense, which would be increased by the necessary purchase of cabinets; and that, even if the work were accomplished, it is doubtful if the benefit would be at all commensurate with the cost, because the larger and more accessible collection of the British Museum would command greater advantages for students than this collection could offer.

That under all these circumstances, as the arrangement of the exotic insects seems hopeless, and the collection is only an incubus on the Society, we recommend that it should be sold by auction.

That there are precedents in other Societies for such a proceeding; and we apprehend no objection would be raised by the persons who have at various times made donations of insects, because their intentions of benefiting the Society and Science have not been and will not be carried out by keeping the collection intact and in its present condition.

That we would except from this disposal the insects presented by the Rev. W. Kirby, and the type specimens of such species as have been first described from the collection in the Society's Transactions or elsewhere.

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And we recommend—

That the proceeds of the sale should be applied to the purchase of entomological books wanting in the Library, and such species of British insects as are not otherwise to be procured.

We take this opportunity of drawing the attention of the Council to the Catalogue of the books in the Library, which was commenced some years since by Mr. Wilkinson, but now for a considerable period discontinued by that gentleman, for want of time to continue it. There is no question that a complete Catalogue of the Society's books would be of great utility to the Members, and, as no other means of procuring it offer, we recommend that the Curator be specially engaged, and paid at the usual rate, for one week, in which time he believes that by continuous application (which is essential in such a work where the books are in circulation) he could take down the titles, &c., of all the books.

At a former period a quantity of non-entomological books was removed and disposed of by order of the Council, but there are still many works and periodicals which either contain no entomological matter or are of no entomological interest or value, and only encumber the shelves, which might be more usefully occupied. We submit that a list of these be prepared and laid before the Council, with a view to their removal and disposal.

(Signed)

JOHN CURTIS, President.
FREDK. SMITH.
J. W. DOUGLAS.
EDWIN SHEPHERD.
EDWARD W. JANSON.

October 15, 1855.

This Report having been read, Mr. Westwood said he had always thought the Society had done wrong in establishing a collection of insects, and that it would have been much better to have spent the sums expended for cabinets and preservation in publishing memoirs in the Society's 'Transactions.' The experience of the Linnean and Zoological Societies in England, and the Entomological Society of France, had

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shown that to keep a large collection of insects was attended with great and unappreciated expense, and the two latter Societies had in consequence disposed of their collections. It was true that this Society's exotic collection never had been, and probably never would be, properly arranged and named; nevertheless to sell it he thought would not be just to the donors, nor favourable to the Society's future interests, for in ten years' time the Members might feel more interest in exotic insects than at present, and wish they had it; therefore he saw no reason why the insects in question should not be kept. Moreover, as the Society was established for the encouragement of Entomology generally, he was unwilling that any distinction should be made between the exotic and the British collection; they should both be kept or both disposed of. He had already, in the Council, unsuccessfully moved that the latter course should be adopted; and he now begged to move, as the necessary result of his argument, "that no portion of the collections be sold."

This motion, seconded by Mr. S. J. Wilkinson, was put from the Chair, and lost by 6 to 11 votes.

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Abstract of the Treasurer's Accounts for 1855.

RECEIPTS.

		£	s.	d.
By Balance on hand January 1st, 1855		51	10	9
„ Arrears of Subscriptions		10	10	0
„ Subscriptions for 1855		107	2	0
„ Admission Fees		16	16	0
„ Tea Subscriptions		12	9	0
„ Sale of 'Transactions' at the Rooms	£23 8 3			
„ „ „ at Longmans'	24 13 0			
		48	1	3
„ Cash of Mr. Baly, for colouring Extra Plates		„	15	6½
		£ 247	4	6½

PAYMENTS.

		£	s.	d.
To paid arrears for 1854:—Messrs. Roworth's printing...	£9 6 0			
Mr. Westwood, for Plates	7 0 0			
Mr. Day, for Plates	2 15 0			
Mr. Dunn, for Oil.....	3 9 0			
Rent to Christmas, 1855	20 0 0			
		42	10	0
„ Rent to Midsummer last, two Quarters		20	0	0
„ Insurance to Lady-day		2	10	0
„ Curator for attendance		18	11	0
„ „ Sundry small payments		„	9	9
„ Tea, thirteen meetings		13	13	0
„ Attendance, Coals, Cleaning, &c.		5	2	0
„ Postage, Parcels, Stationery, &c.		6	13	10
„ Printing 'Transactions,' three parts		35	19	6
„ „ 'Proceedings,' &c.		11	15	9
„ „ Plates		6	15	0
„ Colouring ditto		8	5	3
Balance in hand		74	19	5½
		£ 247	4	6½

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Liabilities and Assets of the Society.

Liabilities.	£	*s.*	*d.*
Mr. Westwood, for Plates ..	4	0	0
„ Smith, for Plates ...	4	10	0
Rent	20	0	0
Messrs. Roworth, for printing	10	3	0
Mr. Dunn, for Oil	4	11	6
£	43	4	6

Assets.	£	*s.*	*d.*
Arrears of Subscriptions, good	6	6	0
Ditto, doubtful £ 15 15 0			
Add balance in hand	74	19	5½
	81	5	5½
Less Accounts due at Xmas.	43	4	6
True Balance in favour of the Society ..... £	38	0	11½

ERRATA.

Page 112. *Dele* the second paragraph under the head "*Exhibitions*" and substitute the following:—

"Mr. Stainton exhibited, on behalf of Mr. Henry Cooke, a specimen of Polyommatus Agestis, which, on the upper side, approached the Scotch specimens known as P. Artaxerxes, but the pupils of the ocelli on the under side were quite distinct."

Page 119, line 29. *After* "number of legs," *insert* "in Mysis."

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GENERAL INDEX.

NOTE.—Where the name only of an Insect is mentioned the description thereof is referred to.

The Figures refer to the pages of the Transactions, and the Numerals to the pages of the Journal of Proceedings.

GENERAL SUBJECTS.

Antennæ, functions of the, cxvii.
Anthemis cotula, insects reared from, xliii.
Anniversary Address, 1855..xlviii; 1856..cxxxi.
Bee-hives, improvements in, xlii.
Books, scientific, the spirit with which they should be read and studied, cxxi.
Bye-laws relating to associates repealed, cxi.
Carduus lanceolatus, insects reared from, xliv.
Champion, Lieut.-Col., obituary notice, liii.
Clavaria on Lepidopterous larva, xvi.
Cockroach, a word for the, lxxvii.
De Haan, W., obituary notice, cxxxiii.
Entomological Students, difficulties of, 84.
Entomologists treated as trespassers, xiv.
Jarman, Rev. D., death of, cxxxii.
Ingpen, Abel, A.L.S., obituary notice, l.
Insects covered with film, xvi, xvii.
duplicates, distribution of the Society's, lxxxvi.
excrement of, 18.
grease in, cure for, iv, lxxxiii, lxxxvii, cxii.
in geological strata, note on, xlvii.
in the human body, xxxiii.
injurious to ferns, c.
forest trees, cii.
fruit trees, lxxvii, cix.
mustard crops, xxiv.
turnip crops, cviii.
motion communicated to seeds by, xxviii, xxxiv, lvii.
phosphorescence in, v, xxxiv.
photographic representations of, xxxvii.

Digitized by Google

Inula dysenterica, insects reared from, xliv.
Juncus glomeratus, Coleophora reared from, xlv.
Library and Cabinet Committee's Report, 1854..lxxii; 1855..cliv.
Mannerheim, Count, death of, liv.
Newport, George, F.R.S., obituary notice, li.
Oak galls, made by a new British *Cynips*, xxxv, xl, lxxvi, lxxxviii, cxiv, cxix, cxxxvi.
species of *Trochilium* and *Cynips*, reared from, xxi.
Pistacia lentiscus, insects reared from, xlv.
Prize Essay for 1854 and 1855..i.
Senecio Jacobea, Diptera reared from, xliv.
Silk-felt, produced by *Saturnia Pavonia-media*, xlii, cxi.
Silk of *Saturnia cecropia*, xcvi.
the Eria, difficulty of unwinding, xvi, xxxi.
Indian method of preparing, lxxvi.
Silk-worm, the "Eria," viii.
Sphæria in Lepidopterous larvæ, xx.
Treasurer's accounts, 1854..lxxiii; 1855..clvii.
Wing-rays of insects, 225.
Wing, William, F.L.S., obituary notice, xlix.
Wings, neuration of, traced by an adaption of the camera obscura to the microscope, cvi.

APHANIPTERA.

Flea belongs to this order, ciii.
economy of, ciii.

ARACHNIDA.

Acari on hay, xxiv.
Acarus, silk spinning of the furze, cxiii.
Method of preserving, xcviii.
Mygale preying on birds, xcix, cxxxviii.

COLEOPTERA.

Acantholophus Adelaidæ, Waterh., 76.
planicollis, Waterh. 78.
Adelotopus ephippiatus, Newm., cxxvii.
rubiginosus, Newm., cxxviii.
Ægus lævicollis, Saund., 54.
punctiger, 55.
Ampedus lugens, Redten., note on, 222.
nigrinus, Payk., note on, 223.
subcarinatus, Germ., note on, 224.
Amycterus crenicollis, Waterh., 79.
Dohrnii, Waterh., 79.
Annomatus 12-striatus, note on, xcvi, xcix.
Apion Curtisii, Kirby, MSS., note on, cxvi, cxxx.
Aplotarsus maritimus, Curt., 15, 224.
cothurnatus, Curt., 16, 224.

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Articerus angusticollis, Westw., 275.
Brasiliensis, Westw., 277.
curvicornis, Westw., 275.
dilaticornis, Westw., 276.
setipes, West., 276.
Asthenorhina Turneri, Westw., 63.
Athous campyloides, note on, xc.
rhombeus, Oliv., larva, 35.
Augomela elegans, Baly, 256.
hypochalcea, Germ., 255.
irridea, Baly, 254.
pfeticsa, Baly, 256.
pyroptera, Baly, 254.
Australica Bartoni, Baly, 245.
cingulata, Baly, 245.
circumfusa, Chevr., 251.
crassicornis, Fab., 249.
curtisii, Kirby, 243.
fulvilabris, Germ., 247.
geniculata, Baly, 248.
ioptera, Baly, 246.
Mac Leayii, Boisd., 244.
maculicollis, Boisd., 246.
pallida, Baly, 248.
pulchella, Baly, 250.
ruficeps, Boisd., 247.
vittata, Baly, 250.
Batrisus angulatus, Westw., 273.
Bolbocerus mobilicornis, method of capturing, xl.
Bolitophagus reticulatus, Lin., larva, 36.
Bryaxis atriventris, Westw., 270.
quadriceps, Westw., 270.
strigicollis, Westw., 269.
Cacostomus squamosus, Newm., 211.
Carabus glabratus, feeding on worms, xlv.
intricatus, capture of, xvii.
Cardiophorus formosus, Curt., 15, 224.
Caryoborus Bactris, larva in palm seeds, xxv.
Ceratorhina Passerinii, Melly, 62.
Smithii, McLeay, 62.
Cetoniidæ, new species of, 61.
Chalcomela eximia, Baly, 260.
illudens, insignis, Baly, 259.
sulcata, Baly, 258.
Chalcolampra acervata, Germ., 184.
chalybeata, Baly, 185.
constricta, Erich., 182.
18-*guttata*, Fab., 186.

Digitized by Google

Chalcolampra parallela, Germ., 183.
pustulata, Baly, 181.
repens, Germ., 184.
similima, Baly, 185.
thoracica, Baly, 183.
Cherrus and *Polyphrades*, note on, iii.
Chrysomela, &c., Monograph of Australian species, 170, 241.
luteicornis, Erich, 262.
nitidipennis, Dej., 262.
orphana, Erich., 263.
pacifica, Erich., 186.
sapphira, Fab., 262.
Cladognathus gracilis, Saund., 47, 203.
picipennis, Westw., 202.
Coleoptera, capture of rare species, ciii, cvii.
of Siam, cx.
proposed Catalogue of British, lxxx, lxxxvii.
small, in the tropics, xciv.
Colophron Thunbergii, Westw., 198.
Westwoodii, Gray, 197.
Cosmiomorpha setulosa, Westw., 70.
Cratonychus castanipes, Payk., captured in Britain, xli.
niger, note on, 223.
Ctenicerus castaneus, larva of, xl.
Cryptocephalus nitens, capture of, ciii.
Cyclomela nitida, Baly, 257.
Deretaphrus, note on, lxxxix.
Dicronocephalus Wallichii, Hope, 69.
Dicronorhina micans, Drury, 61.
Dinodes Maillei, Dej., a new British species, cviii.
Diphyllocera gemellata, Westw., 176.
Dohrnia miranda, note on, lxxxix.
Dorcus? *luteus*, Westw., 218.
marginalis, Saund., 53.
obscurus, 52.
striatus, 53.
striato-punctatus, 51.
vicinus, 51.
Pelorides, Westw., 220.
Drypta emarginata, capture of, xcix, ciii.
Ectinus aterrimus, Lin., 12, 222.
? *gagates*, Curt., 12, 222.
Elater longicollis, Fab., economy of, xlv.
nigrinus, Payk., 14, 223.
Elateridæ, British, critical remarks upon, 10, 222..lxxxv.
feeding on *Aphides*, cx.
(n. g.) ? *puncto-lineatus*, 13.
proposed monograph of, lxxviii.

Digitized by Google

Eulina Curtisii, Baly, 180.
Euplectus sulcicollis, Redt., note on, xcvi.
Eupœcila ochracea, Westw., 73.
succinea, Hope, 74.
Figulus Lilliputanus, Westw., 219.
Geodephaga, locality for, cxi.
Gnathocera Angolensis, Westw., 65.
Gnorimus nobilis, larva in wood of a cherry tree, xxxvii.
Gnostus formicicola, Westw., 90.
Harpalus cordatus, capture of, cviii.
Helobia brevicollis, luminosity of, xxxiv.
economy of, xlv.
impressa, Newm., note on, xlii.
Heterrhorhina bicostata, Schaum, 66.
Westw., remarks on, lxxxiv.
Hygrotus bisulcatus, Curtis, note on, cxvi, cxxx.
Hylecœtus dermestoides, habit of, xiii.
Hypulus quercinus, capture of, xvii.
Lamprolina æneipennis, Boisd., 177.
grandis, Baly, 178.
perplexa, Baly, 261.
puncticollis, Baly, 179.
simillima, Baly, 178.
Langelandia anophthalma, note on, xcvi, xcix.
Larvæ, description of some, 33.
Lebia crux-minor, capture of, cxxi.
Lissotes Cancroides, Fab., 215.
crenatus, Lat., 216.
Menalcas, Westw., 214.
obtusatus, Westw., 217.
reticulatus, Westw., 218.
subtuberculatus, 215.
Lucanidæ, new species of, 197.
Lucanus biplagiatus, Westw., 200.
Fortunei, Parry, 46.
Thibeticus, Westw., 199.
Ludius ferrugineus, capture of, xx, ciii.
Macronata fraternata, Westw., 71.
regia, Fab., 72.
setipes, Westw., 73.
Malachius bipustulatus and *M. æneus*, economy of, xlv.
Metopias bellicosus, Westw., 278.
Curculionides, Westw., 278.
pacificus, Westw., 279.
Micromela cupripennis, Baly, 261.
Notiophilus rufipes, capture of, cxiii.
Notoclea splendens, McLeay, 262.
Odontolabris emarginatus, Reiche, 49, 202.

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Odontolabris Evansii, Westw., 201.
nitidus, Saund., 47.
sinicus, Reiche, 48.
Omias sulcifrons, note on, lxxxv.
Otiorynchus septentrionis, Herbst., captured in Scotland, xxxiii.
sulcatus, economy of, c.
Paussidæ, note on, cxxi.
Paussus Afzelii, 82.
Bohemani, 83.
De Geerii, 82.
pacificus, 81.
Phyllocharis cyanicornis, Fab., 171.
cyanipennis, Baly, 174.
cyanipes, Fab., 172.
flexuosa, Baly, 175.
leoparda, Baly, 173.
nigricornis, Fab., 175.
Platymela sticticollis, Baly, 241.
unilineata, Baly, 242.
Platynocephalus Hamiltoni, Westw., 67.
Platyprosopus Hopei, Saund., 50.
platymelus, Saund., 50.
Prostomis mandibularis, Fab., larva, 37.
Psalidocoptus scaber, name proposed for a longicorn, xcix.
Pselaphidæ, new species of, 268.
Pselaphus Antipodum, Westw., 274.
geminatus, Westw., 273.
Pseudomorpha amaroides, Newm., cxxvii.
Pyrochroa pectinicornis, a new British species, xvii.
Quedius dilatatus, habitat of, cxii, cxvii.
Sclerostomus caviceps, Westw., 212.
costatus, Burm., 209.
Ditomoides, Westw., 208.
femoralis, Guer., 209.
hastatus, Westw., 205.
Neotragus, Westw., 207.
Scortixus maculatus, Klug., 210.
Sphærites glabratus, capture of, cxii.
Staphylinidæ, capture of rare species, xlvi.
larvæ feed on worms, xlv.
Stenus, the British species of the genus, 136.
Notes on the species described by Kirby and Stephens, 143.
Stethomela poroptera, Baly, 253.
prasina, Baly, 252.
submetallica, Chev., 252.
Streptocerus speciosus, Fairm., 204.
Tmesorrhina Saundersii, Westw., 64.
Trachodes hispidus, capture of, xx.

Digitized by Google

Tyrus humeralis, Westw., 272.
spinosus, Westw., 271.
Velleius dilatatus, Fab., larva, 33.

CRUSTACEA.

Candona albida, 235.
Cyclops brevicornis, 237.
Cypris Australis, Brasiliensis, Chilensis, 234.
Donnettii, 233.
speciosa, 234.
Daphnia Brasiliensis, granaria, spinifera, 236.
Diaptomus Brasiliensis, 237.
Entomostraca, the fresh water of South America, 232.
Palæmon serratus, note on, cxviii.

DIPTERA.

Agromyza Pistaciæ, name proposed, xlv.
Conops macrocephala, note on, cxvi.
nigra, note on, cxvii.
Elachipteron brevipennis, economy of, cviii.
Phora urbana, expelled from the human body, 33.

HOMOPTERA.

Coccus arborum-linearis, destructive to fruit trees, lxxvii.

HYMENOPTERA.

Anthidium cordatum, nest of, cxxx.
Ants, Brazilian, economy of, 156.
destructive to *Cocci*, x.
nests, *Coleoptera* inhabiting, 90.
Bee, honey, new enemy to the, lxxxii.
observations on, 187.
South African, lxxxi.
Chalcidoma cælocera, nest of, cxxix.
Cremastus Buoliana, Curt., 60.
Cynips, a new British species of, xxxv, xl, lxxvi, lxxxviii, cxix.
lignicola, Hartig, a new British species, cxiv.
palliceps, xxi.
Eciton crassicornis, Smith, 163.
curvidentata, Latr., 162.
hamata, Fabr., 160.
legionis, Smith, 164.
rapax, Smith, 163.
simillima, Smith, 164.
vagans, Oliv., 162.
Eumenes tinctor, nest of, cxxviii.

Digitized by Google

Evaniidæ, economy of, xxi.
Formica cunicularia, Latr., 103.
flava, De Geer, 108.
fuliginosa, Latr., 105.
fusca, Lin., 104.
nigra, Lin., 109.
rufa, Lin., 100.
sanguinea, Latr., 101.
umbrata, Nyland., 106.
Formicidæ, British genera and species, 95.
Icaria guttatipennis, nest of, cxxix.
Ichneumon paludator, 44.
Mischocyttarus labiatus, nest of, cxxix.
Myrmecina Latreillei, Curt., 132.
Myrmica acervorum, Fab., 124.
cæspitum, Lin., 122.
denticornis, Curt., 120.
domestica, Shuck., 130.
flavidula, &c., capture of, xxiv.
fugax, Latr., 127.
graminicola, Lat. 126.
lævigata, Smith, 130.
lævinodis, Nyland, 118.
longiscapa, Curt., 122.
ruginodis, Nyland., 116.
scabrinodis, Nyland., 115.
simillima, Nyland., 129.
sulcinodis, Nyland., 119.
unifasciata, Latr., 128.
Nomada armata, capture of, xvii.
Odynerus parietum, economy of, 43.
Pelopæus chalybeus, nest of, cxxix.
economy of, 42.
Peromachus, economy of several species, xlvi.
Pompilus punctum, economy of, 41.
Ponera contracta, Latr., 113.
Pseudomyrma bicolor, Guér., 157.
cephalica, Smith, 168.
elegans, Smith, 159.
maculata, Smith, 158.
nigriceps, Smith, 159.
oculata, Smith, 159.
pallida, Smith, 160.
sericata, Smith, 159.
termitaria, Smith, 158.
testacea, Smith, 158.
unicolor, Smith, 158.
Raphigaster Guinensis, nest of, cxxix.

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Sapyga 4-guttata, economy of, 42.
Stenamma albipennis, Curt., 134.
Westwoodii, Steph., 134.
note on the genus, xcii.
Synagris calida, and *S. mirabilis*, nests of, cxxviii.
Tupinoma erratica, Latr., 111.
polita, Smith, 112.
Tenthredo cingulata, ♀, capture of, xvii.
Trypoxylon, economy of, 42.
Wasps' nests, material of, xviii, xix, xxv, lv.
Xylocopa violacea, capture of in England, cviii.

LEPIDOPTERA.

Acentropus Garnonsii, capture of, xxiv.
Acherontia Atropos, var. of larva, xix.
Adela Laurella, Newm., 290.
Agrotis Ashworthii, xciv.
lunigera, capture of, ciii.
Anarsia Genistæ, food of the larva, xcii.
Anarta cordigera, economy of, xcvi.
Anesychia Stella, Newm., 290.
Anthocharis Cardamines, var., xxxvii.
Anthrocera Filipendulæ, var., ciii.
Argynnis Euphrosyne, var., ii, iv.
Lathonia, capture of, xxxvii, lxxxix.
Paphia, var., ii, iv.
Asychna eratella, capture of, ciii.
economy of, xcix.
Bombyx Cynthia, introduction into Malta and Italy, viii, xxviii, xxxviii, xci.
Bondia Nigella, Newm., 289.
Boydia criniferella, Newm., 292.
Butterflies, habits of Eastern, lxxxi.
Callimorpha Hera, captured in England, cxxv.
Caradrina alsines, and *C. blanda*, note on, ciii.
Chimabacche Cinderella, Newm., 288.
Cloantha conspicillaris, capture of, lxxxix.
Coriscium orientale, Staint., 301.
Cryptoblabes Rutilella, food of the larva, xci.
Cynthia Cardui, remarkable var., xc.
Depressaria capreolella, capture of, ix.
Lewinella and *Melesella*, Newm., 291.
Dyctiopteryx uliginosana, capture of, cxii.
Elachista Brunnichiella, food of the larva, cvi.
Poæ, a new species, xiii.
remarks on the economy of the genus, 85.
Rivillei, suggested as a name for a species whose larva mines vine leaves, 87.
triseriatella, capture of, xxxiv.

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Endromis versicolor, capture of, lxxxix.
habit of, cxvii.
Entometa obliqua, an Australian *Bombyx* escaping from its cocoon in England, cxiv.
Gluphisia crenata, larva of, ix.
Glyphipteryx Sabella, Newm., 297.
Goniodoma auroguttella, capture of, cxii.
Grapholita corollana, economy of, xxvii.
Gymnancyla canella, food of the larva, xci.
Heliophobus hispidus, capture of, cviii.
Homœosoma binævella, food of the larva, xci.
Hyponomeuta plumbellus, economy of, xiii.
Incurvaria tenuicornis, capture of, xvi.
Lepidoptera, capture of rare species, ciii,
method of packing, lxxx.
Leucania musculosa, capture of, cvi.
Limacodes asellus, capture of, xix.
Lithocolletis Bauhiniæ, Atkinson, 303.
Bremiella, a new British species, cviii.
irradiella, Scott, 9.
Lalagella, Newm., 300.
Micro-Lepidoptera, tropical, lxxxvii, xciii, 301.
Moths on street lamps, ii.
Nepticula 4-maculella, note on, xviii.
Notodonta carmelita, bred from the egg, lxxxix.
cucullina, larva of, xiii.
bred from the egg, lxxxix.
Noctuidæ, abundant in 1855..civ, cxiv.
Œcophora Agnesella, Newm., 297.
Arabella, Newm., 296.
bimaculella, Newm., 295.
Ellenella, Newm., 295.
Hecatella, Newm., 299.
Isabella, Newm., 295.
Marionella, Newm., 294.
Paulinella, Newm., 297.
Sabella, 299.
Semelella, Newm., 298.
Zitella, Newm., 296.
Œnosandra Boisduvalii, 286.
Ornithoptera Brookiana, civ.
Orthosia hyperborea, capture of, xxiii.
Orthotænia Buoliana, remarks on, 59.
Papilio Antenor, Drury, locality for, xl.
Nomius, *Pammon* and *Polytes*, *Polydorus*, note on, cix.
Parasia Metznerisella, food of the larva, xvii.
Perophora Batesii, 5, xii.
Melsheimerii, 2.
Phlogophora empyrea, a new British species, cxii.

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Phyllocnistis Citrella, Atkinson, 303.
Polia occulta, note on, civ.
Polyommatus Agestis, var., cxii.
Alexis, hermaphrodite, xxiv.
Prays Curtisellus, economy of, xiii.
Psyche helicinella, note on, lxxviii.
Pterophorus tinctidactylus, Newm., 300.
Saturnia cecropia, note on, xcvi.
Pavonia-media, silk felt produced by, xlii, cxi.
Ricini, note on, xci, civ.
Spælotis Valesiaca? capture of, in Britain, xxiii.
Spermatophthora Hornigii, food of the larva, xci.
Sphinx Celerio? note on larva of, cxv.
Teara denticulata, Newm., 282.
Edwardsii and *Guenei*, Newm., 284.
Termessa Shepherdi, Newm., 285.
Tinea Ethelella, Newm., 288.
pellionella, larva on hartshorn shavings, iv.
Tortricopsis Rosabella, Newm., 293.
Tortrix Ashworthana, Newm., 286.
Standishana, Newm., 287.
Trochilium Chrysidiforme, capture of, ciii, cxi.
gallivorum, xxi.
Scoliæforme, a new British species, cxv.
Vanessa Urticæ, var., xxxvii.
Zeuzera Duponchelii, Newm., 282.
Zygæna Minos, a new British species, iv.

NEUROPTERA.

Coniopteryx, nomenclature of, 57, xcii.
Hemerobius dipterus, Burm., 56.
Idolothrips Halidayi, Newm., 265.
Phlæothrips Anacardii, Newm., 266.
Sisyra terminalis, Curt., 56.

ORTHOPTERA.

Cockroaches eat bed-bugs, lxxvii.

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ERRATA.

Page 11, line 9, for "*C.* T. Bennett," read "E. T. Bennett."
„ 12 „ 12, for "Pauz," read "Panz."
„ 12 „ 26, for "Nurenburg," read "Nuremburg."
„ 13 „ 4th from bottom, add, "Claws pectinated."
„ 14, last line but one, for "fibrous," read "ocherous."
„ 17, note * add "Annales de la Soc. Ent. de France."
„ 36 „ 22, for "2nd," read "two."
„ 36 „ 33, for "stigma," read "spiracles."
„ 39 „ 10, for "Delarouzée," read "Delarouzée."
„ 39 „ 35, for "coxæ and tibiæ," read "coxa and tibia."
„ 39 „ 38, for "maxillæ," read "maxilla."
„ 39 „ 39, for "palpi," read "palpus."
„ 46 „ 8, for "*lateralis*," read "*marginalis*."

JOURNAL OF PROCEEDINGS.

Page 37, line 12, for "cherry-tree drooping," read "drooping cherry-tree."
„ 40 „ 27 and 30, for "murinus," read "castaneus."
„ 40 „ 28, insert a comma after "Kuper."
„ 42 „ 3, dele "t" in "Schwartzdornspinner."
„ 42 „ 11, for "readily," read "easily."
„ 45 „ 23, for "this family," read "*Staphylinidæ*."
„ 112. Dele the second paragraph under the head *Exhibitions*, and substitute the following:—

> "Mr. Stainton exhibited, on behalf of Mr. Henry Cooke, a specimen of *Polyommatus Agestis*, which, on the upper side, approached the Scotch specimens known as *P. Artaxerxes*, but the pupils of the ocelli on the underside were quite distinct."

„ 119, line 28, after "legs," insert "in Mysis."

Plate II.

Obs.—The tarsi in figures 1, 2, 4 and 7 are incorrect; they ought all to be 5-jointed, but the engraver has represented them with four, five and six joints, and they are made too thick. The claws in fig. 3 are not stout enough, for they are pectinated, and the thoracic angles are too long and too acute.

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